

Ser Gly Met Glu Asp Ile Phe Val Gly Glu Thr Ile Thr Pro Thr Asp
 290 295 300
 Ala Val Glu Ala Leu Pro Ile Leu His Ile Asp Glu Pro Thr Leu Gln
 305 310 315 320
 Met Thr Phe Leu Val Asn Asn Ser Pro Phe Ala Gly Lys Glu Gly Lys
 325 330 335
 Trp Val Thr Ser Arg Lys Val Glu Glu Arg Leu Gln Ala Glu Leu Gln
 340 345 350
 Thr Asp Val Ser Leu Arg Val Asp Pro Thr Asp Ser Pro Asp Lys Trp
 355 360 365
 Thr Val Ser Gly Arg Gly Glu Leu His Leu Ser Ile Leu Ile Glu Thr
 370 375 380
 Met Arg Arg Glu Gly Tyr Glu Leu Gln Val Ser Arg Pro Glu Val Ile
 385 390 395 400
 Val Lys Glu Ile Asp Gly Ile Lys Cys Glu Pro Phe Glu Arg Val Gln
 405 410 415
 Ile Asp Thr Pro Glu Glu Tyr Gln Gly Ser Val Ile Gln Ser Leu Ser
 420 425 430
 Glu Arg Lys Gly Glu Met Leu Asp Met Ile Ser Thr Gly Asn Gly Gln
 435 440 445
 Thr Arg Leu Val Phe Leu Val Pro Ala Arg Gly Leu Ile Gly Tyr Ser
 450 455 460
 Thr Glu Phe Leu Ser Met Thr Arg Gly Tyr Gly Ile Met Asn His Thr
 465 470 475 480
 Phe Asp Gln Tyr Leu Pro Leu Ile Pro Gly Glu Ile Gly Gly Arg His
 485 490 495
 Arg Gly Ala Leu Val Ser Ile Asp Ala Gly Lys Ala Thr Thr Tyr Ser

	500								505						510						
Ile Met Ser Ile Glu Glu Arg Gly Thr Ile Phe Val Asn Pro Gly Thr																					
	515								520						525						
Glu Val Tyr Glu Gly Met Ile Ile Gly Glu Asn Ser Arg Glu Asn Asp																					
	530								535						540						
Leu Thr Val Asn Ile Thr Lys Ala Lys Gln Met Thr Asn Val Arg Ser																					
	545								550						555						
Ala Thr Lys Asp Gln Thr Ala Val Ile Lys Thr Pro Arg Ile Leu Thr																					
	565								570						575						
Leu Glu Glu Ser Leu Glu Phe Leu Asn Asp Asp Glu Tyr Met Glu Val																					
	580								585						590						
Thr Pro Glu Ser Ile Arg Leu Arg Lys Gln Ile Leu Asn Lys Ala Glu																					
	595								600						605						
Arg Glu Lys Ala Asn Lys Lys Lys Lys Ser Ala Glu																					
	610								615						620						
<210>	642																				
<211>	378																				
<212>	PRT																				
<213>	Streptococcus pneumoniae																				
<400>	642																				
Met Ser Tyr Lys Thr Ser Asn Ala Glu Gly His Val Asp Phe Ile Asn																					
1	5 10 15																				
Thr Tyr Asp Leu Glu Pro Met Ala Gln Gln Val Ile Pro Lys Ala Ala																					
	20 25 30																				
Phe Gly Tyr Ile Ala Ser Gly Ala Glu Asp Thr Phe Thr Leu Arg Glu																					
	35 40 45																				
Asn Ile Arg Ala Phe Asn His Lys Leu Ile Val Pro His Thr Leu Cys																					
	50 55 60																				
Asn Val Glu Asn Pro Ser Thr Glu Ile Glu Phe Ala Gly Glu Lys Leu																					

65		70		75		80
Ser Ser Pro Ile	Ile Met Ala Pro Val	Ala Ala His Lys	Leu Ala Asn			
	85		90			95
Glu Gln Gly	Glu Val Ala Thr	Ala Arg Gly	Val His Glu	Phe Gly Ser		
	100		105		110	
Leu Tyr Thr	Thr Ser Ser Tyr	Ser Thr Val	Asp Leu Pro	Glu Ile Ser		
	115		120		125	
Glu Ala Leu	Gln Gly Thr	Pro His Trp	Phe Gln Phe	Tyr Phe Ser Lys		
	130		135		140	
Asp Asp Gly	Ile Asn Arg His	Ile Met Asp	Arg Val Lys	Ala Glu Gly		
	145		150		155	160
Tyr Lys Ala	Ile Val Leu Thr	Ala Asp Ala	Thr Val Gly	Gly Asn Arg		
	165		170		175	
Glu Val Asp	Lys Arg Asn Gly	Phe Val Phe	Pro Val Gly	Met Pro Ile		
	180		185		190	
Val Glu Glu	Tyr Leu Pro Glu	Gly Ala Gly	Lys Ser Met	Asp Phe Val		
	195		200		205	
Tyr Lys Ser	Ala Lys Gln Arg	Leu Ser Pro	Arg Asp Val	Glu Phe Ile		
	210		215		220	
Ala Glu Tyr	Ser Gly Leu Pro	Val Tyr Val	Lys Gly Pro	Gln Cys Arg		
	225		230		235	240
Glu Asp Val	Glu Arg Ser Leu	Ala Ala Gly	Ala Ser Gly	Ile Trp Val		
	245		250		255	
Thr Asn His	Gly Gly Arg Gln	Ile Asp Gly	Gly Gly Pro	Ala Ala Phe	Asp	
	260		265		270	
Ser Leu Gln	Glu Val Ala Glu	Ala Val Asp	Arg Arg Val	Pro Ile Val		
	275		280		285	

Phe Asp Ser Gly Val Arg Arg Gly Gln His Val Phe Lys Ala Leu Ala
 290 295 300

Ser Gly Ala Asp Leu Val Ala Ile Gly Arg Pro Val Ile Tyr Gly Leu
 305 310 315 320

Ala Leu Gly Gly Ser Val Gly Val Arg Gln Val Phe Glu His Leu Asn
 325 330 335

Ala Glu Leu Lys Thr Val Met Gln Leu Ser Gly Thr Gln Thr Ile Glu
 340 345 350

Asp Val Lys His Phe Lys Leu Arg His Asn Pro Tyr Asn Pro Thr Phe
 355 360 365

Pro Val Asp Pro Arg Asp Leu Lys Leu Tyr
 370 375

<210> 643

<211> 314

<212> PRT

<213> Streptococcus pneumoniae

<400> 643

Met Ser Glu Pro Leu Phe Leu Gln Ser Val Met Gln Glu Lys Ile Trp
 1 5 10 15

Gly Gly Ala Lys Leu Arg Asp Glu Phe Gly Tyr Asp Ile Pro Ser Glu
 20 25 30

Lys Ile Gly Glu Tyr Trp Ala Ile Ser Ala His Pro Asn Gly Val Ser
 35 40 45

Lys Val Ala Asn Gly Arg Tyr Glu Gly Thr Asp Leu Ala Thr Leu Tyr
 50 55 60

Ala Glu His Arg Glu Leu Phe Gly Asn Arg Pro Glu Pro Val Phe Pro
 65 70 75 80

Leu Leu Thr Lys Ile Leu Asp Ala Asn Asp Trp Leu Ser Val Gln Val
 85 90 95

His Pro Asp Asp Ala Tyr Gly Leu Glu His Glu Gly Glu Leu Gly Lys
 100 105 110

Thr Glu Cys Trp Tyr Ile Ile Ala Ala Asp Glu Gly Ser Glu Ile Ile
 115 120 125

Tyr Gly His Asn Ala Lys Ser Lys Glu Glu Leu Arg Gln Gln Ile Glu
 130 135 140

Asp Lys Asn Trp Asp Asp Leu Leu Thr Lys Val Pro Val Lys Ala Gly
 145 150 155 160

Asp Phe Phe Tyr Val Pro Ser Gly Thr Met His Ala Ile Gly Ala Gly
 165 170 175

Ile Leu Ile Leu Glu Thr Gln Gln Ser Ser Asp Thr Thr Tyr Arg Val
 180 185 190

Tyr Asp Phe Asp Arg Lys Asp Asp Lys Gly Asn Leu Arg Glu Leu His
 195 200 205

Leu Glu Lys Ser Ile Asp Val Leu Asn Ile Gly Glu Pro Ala Asn Ser
 210 215 220

Arg Pro Val Thr Val Lys Ala Asp Asp Leu Arg Ser Thr Leu Leu Val
 225 230 235 240

Ser Asn Asp Phe Phe Ala Val Tyr Lys Trp Glu Ile Thr Gly Lys Val
 245 250 255

Asp Phe Glu Lys Thr Ala Asp Tyr Ser Leu Leu Ser Val Leu Ala Gly
 260 265 270

Gln Gly Gln Leu Thr Val Asp Gly Lys Asn Tyr Pro Ile Gln Lys Gly
 275 280 285

Ser His Phe Ile Leu Pro Ser Asp Val Glu Ala Trp Thr Leu Glu Gly
 290 295 300

Gln Gly Leu Glu Leu Ile Val Ser His Pro
 305 310

<210> 644
 <211> 281
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 644

Met Thr Trp Lys Ile Ile Ala Asp Ser Gly Cys Asp Tyr Arg Gln Leu
 1 5 10 15

Pro Thr Pro Ala Ile Asn Thr Thr Phe Val Ser Val Pro Leu Thr Ile
 20 25 30

Gln Val Ala Asp Gln Val Phe Val Asp Asp Ala Ser Leu Asp Ile Asp
 35 40 45

Gln Met Met Glu Thr Met Tyr Ala Thr Ala Glu Ala Ser Lys Ser Ala
 50 55 60

Cys Pro Ser Pro Asp Asp Tyr Leu Arg Ala Phe Glu Gly Ala Lys Asn
 65 70 75 80

Ile Phe Leu Val Thr Ile Thr Gly Thr Leu Ser Gly Ser His Asn Ser
 85 90 95

Ala Gln Leu Ala Lys Asn Ile Tyr Leu Glu Asp His Pro Asp Thr Lys
 100 105 110

Ile His Val Ile Asp Ser Leu Ser Ala Gly Gly Glu Val Asp Leu Leu
 115 120 125

Val Glu Lys Leu Asn Asp Leu Ile Asp Gln Gly Leu Ser Phe Glu Glu
 130 135 140

Val Val Glu Ala Ile Thr Ala Tyr Gln Glu Lys Thr Lys Leu Leu Phe
 145 150 155 160

Val Leu Ala Lys Val Asp Asn Leu Val Lys Asn Gly Arg Leu Ser Lys
 165 170 175

Leu Ile Gly Thr Val Val Gly Leu Leu Asn Ile Arg Met Val Gly Lys
 180 185 190

Ala Ser Glu Thr Gly Thr Leu Glu Leu Leu Gln Lys Ala Arg Gly Ser
 195 200 205

Lys Lys Ser Val Gln Ala Ala Tyr Asp Glu Leu Val Lys Ala Gly Tyr
 210 215 220

Ala Gly Gly Arg Ile Val Met Ala Gln Arg Asn Asn Glu Lys Cys Cys
 225 230 235 240

Gln Gln Leu Ser Glu Arg Ile Arg Glu Thr Phe Pro Gln Ala Asp Ile
 245 250 255

Lys Ile Leu Pro Thr Ser Gly Leu Cys Ser Phe Tyr Ala Glu Glu Gly
 260 265 270

Gly Leu Leu Met Gly Tyr Glu Ile Asp
 275 280

<210> 645

<211> 216

<212> PRT

<213> Streptococcus pneumoniae

<400> 645

Met Lys Glu Gly Ile Pro Lys Met Gly Lys Ile Glu Val Ile Asn His
 1 5 10 15

Pro Leu Ile Gln His Lys Leu Ser Ile Leu Arg Arg Thr Asp Thr Ser
 20 25 30

Thr Lys Ala Phe Arg Glu Leu Val Asp Glu Ile Ala Met Leu Met Gly
 35 40 45

Tyr Glu Val Leu Arg Asp Leu Pro Leu Glu Asp Val Glu Ile Glu Thr
 50 55 60

Pro Ile Thr Lys Thr Val Gln Lys Gln Leu Ala Gly Lys Lys Leu Ala
 65 70 75 80

Ile Val Pro Ile Leu Arg Ala Gly Ile Gly Met Val Asp Gly Leu Leu
 85 90 95

Asn Leu Val Pro Ala Ala Lys Val Gly His Ile Gly Met Tyr Arg Asp
 100 105 110

Glu Glu Thr Leu Gln Pro Val Glu Tyr Leu Val Lys Leu Pro Glu Asp
 115 120 125

Ile Asp Gln Arg Gln Ile Phe Val Val Asp Pro Met Leu Ala Thr Gly
 130 135 140

Gly Ser Ala Ile Leu Ala Val Asp Ser Leu Lys Lys Arg Gly Ala Ser
 145 150 155 160

Asn Ile Lys Phe Val Cys Leu Val Ser Ala Pro Glu Gly Val Lys Ala
 165 170 175

Leu Gln Glu Ala His Pro Asp Val Glu Ile Phe Thr Ala Ala Leu Asp
 180 185 190

Glu Arg Leu Asn Glu His Gly Tyr Ile Val Pro Gly Leu Gly Asp Ala
 195 200 205

Gly Asp Arg Leu Phe Gly Thr Lys
 210 215

<210> 646

<211> 252

<212> PRT

<213> Streptococcus pneumoniae

<400> 646

Met Ile Ser Pro Ser Ala Thr Gln Asp Gly Leu Thr Lys Gly Gln Asp
 1 5 10 15

Tyr Leu Phe Ile Gly Thr Phe Gln Asp Ser Phe Gln Gly Lys Ile Ile
 20 25 30

Ser Asn Tyr Val Ser Glu Lys Leu Asn Ala Lys Lys Val Val Leu Tyr
 35 40 45

Thr Asp Asn Ala Ser Asp Tyr Ala Lys Gly Ile Ala Lys Ser Phe Arg
 50 55 60

Glu Ser Tyr Lys Gly Glu Ile Val Ala Asp Glu Thr Phe Val Ala Gly
65 70 75 80

Asp Thr Asp Phe Gln Ala Ala Leu Thr Lys Met Lys Gly Lys Asp Phe
85 90 95

Asp Ala Ile Val Val Pro Gly Tyr Tyr Asn Glu Ala Gly Lys Ile Val
100 105 110

Asn Gln Ala Arg Gly Met Gly Ile Asp Lys Pro Ile Val Gly Gly Asp
115 120 125

Gly Phe Asn Gly Glu Glu Phe Val Gln Gln Ala Thr Ala Glu Lys Ala
130 135 140

Ser Asn Ile Tyr Phe Ile Ser Gly Phe Ser Thr Thr Val Glu Val Ser
145 150 155 160

Ala Lys Ala Lys Ala Phe Leu Asp Ala Tyr Arg Ala Lys Tyr Asn Glu
165 170 175

Glu Pro Ser Thr Phe Ala Ala Leu Ala Tyr Asp Ser Val His Leu Val
180 185 190

Ala Asn Ala Ala Lys Gly Ala Lys Asn Ser Gly Glu Ile Lys Asn Asn
195 200 205

Leu Ala Lys Thr Lys Asp Phe Glu Gly Val Thr Gly Gln Thr Ser Phe
210 215 220

Asp Ala Asp His Asn Thr Val Lys Thr Ala Tyr Met Met Thr Met Asn
225 230 235 240

Asn Gly Lys Val Glu Ala Ala Glu Val Val Lys Pro
245 250

<210> 647

<211> 396

<212> PRT

<213> Streptococcus pneumoniae

<400> 647

Met Ser Glu Arg Lys Leu Phe Thr Ser Glu Ser Val Ser Glu Gly His
 1 5 10 15
 Pro Asp Lys Ile Ala Asp Gln Ile Ser Asp Ala Ile Leu Asp Ala Ile
 20 25 30
 Leu Ala Lys Asp Pro Glu Ala His Val Ala Ala Glu Thr Ala Val Tyr
 35 40 45
 Thr Gly Ser Val His Val Phe Gly Glu Ile Ser Thr Asn Ala Tyr Val
 50 55 60
 Asp Ile Asn Arg Val Val Arg Asp Thr Ile Ala Glu Ile Gly Tyr Thr
 65 70 75 80
 Asn Thr Glu Tyr Gly Phe Ser Ala Glu Thr Val Gly Val His Pro Ser
 85 90 95
 Leu Val Glu Gln Ser Pro Asp Ile Ala Gln Gly Val Asn Glu Ala Leu
 100 105 110
 Glu Val Arg Gly Asn Ala Asp Gln Asp Pro Leu Asp Leu Ile Gly Ala
 115 120 125
 Gly Asp Gln Gly Leu Met Phe Gly Phe Ala Val Asp Glu Thr Glu Glu
 130 135 140
 Leu Met Pro Leu Pro Ile Ala Leu Ser His Lys Leu Val Arg Arg Leu
 145 150 155 160
 Ala Glu Leu Arg Lys Ser Gly Glu Ile Ser Tyr Leu Arg Pro Asp Ala
 165 170 175
 Lys Ser Gln Val Thr Val Glu Tyr Asp Glu Asn Asp Arg Pro Val Arg
 180 185 190
 Val Asp Thr Val Val Ile Ser Thr Gln His Asp Pro Glu Ala Thr Asn
 195 200 205
 Glu Gln Ile His Gln Asp Val Ile Asp Lys Val Ile Lys Glu Val Ile
 210 215 220

Pro Ser Ser Tyr Leu Asp Asp Lys Thr Lys Phe Phe Ile Asn Pro Thr
 225 230 235 240
 Gly Arg Phe Val Ile Gly Gly Pro Gln Gly Asp Ser Gly Leu Thr Gly
 245 250 255
 Arg Lys Ile Ile Val Asp Thr Tyr Gly Gly Tyr Ser Arg His Gly Gly
 260 265 270
 Gly Ala Phe Ser Gly Lys Asp Ala Thr Lys Val Asp Arg Ser Ala Ser
 275 280 285
 Tyr Ala Ala Arg Tyr Ile Ala Lys Asn Ile Val Ala Ala Asp Leu Ala
 290 295 300
 Lys Lys Ala Glu Val Gln Leu Ala Tyr Ala Ile Gly Val Ala Gln Pro
 305 310 315 320
 Val Ser Val Arg Ile Asp Thr Phe Gly Thr Gly Thr Val Ala Glu Ser
 325 330 335
 Gln Leu Glu Lys Ala Ala Arg Gln Ile Phe Asp Leu Arg Pro Ala Gly
 340 345 350
 Ile Ile Gln Met Leu Asp Leu Lys Arg Pro Ile Tyr Arg Gln Thr Ser
 355 360 365
 Ala Tyr Gly His Met Gly Arg Thr Asp Ile Asp Leu Pro Trp Glu Arg
 370 375 380
 Leu Asp Lys Val Asp Ala Leu Lys Glu Ala Val Lys
 385 390 395
 <210> 648
 <211> 90
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 648
 Met Ala Val Lys Ile Arg Leu Thr Arg Met Gly Ser Lys Lys Lys Pro
 1 5 10 15

Phe Tyr Arg Ile Asn Val Ala Asp Ser Arg Ser Pro Arg Asp Gly Arg
 20 25 30

Phe Ile Glu Thr Val Gly Thr Tyr Asn Pro Leu Val Ala Glu Asn Gln
 35 40 45

Val Thr Leu Lys Glu Asp Arg Val Leu Ala Trp Leu Ala Asn Gly Ala
 50 55 60

Gln Pro Ser Asp Thr Val Arg Asn Ile Leu Ser Lys Glu Gly Val Leu
 65 70 75 80

Lys Lys Phe His Asp Ser Lys Phe Ser Lys
 85 90

<210> 649

<211> 112

<212> PRT

<213> Streptococcus pneumoniae

<400> 649

Met Gln Val Ile Lys Arg Asn Gly Glu Ile Ala Glu Phe Asn Pro Asp
 1 5 10 15

Lys Ile Tyr Gln Ala Ile Leu Lys Ala Ala Gln Thr Val Tyr Val Leu
 20 25 30

Thr Asp Asp Leu Arg Gln Asn Leu Ala Gln Val Thr Lys Lys Val Val
 35 40 45

Leu Asp Leu Gln Glu Ala Lys Val Glu Arg Ala Thr Ile Ser Met Ile
 50 55 60

Gln Ser Met Val Glu His Arg Leu Leu Gly Ala Gly Tyr Ile Thr Ile
 65 70 75 80

Ala Glu His Tyr Ile Ser Tyr Arg Leu Gln Arg Asp Leu Glu Arg Ser
 85 90 95

Gly Tyr Gly Asp His Ile Ala Val His Leu His Phe Glu Gln Ile Arg
 100 105 110

<210> 650

<211> 752

<212> PRT

<213> Streptococcus pneumoniae

<400> 650

Met Leu Cys Gln Asn Cys Lys Ile Asn Asp Ser Thr Ile His Leu Tyr
 1 5 10 15

Thr Asn Leu Asn Gly Lys Gln Lys Gln Ile Asp Leu Cys Gln Asn Cys
 20 25 30

Tyr Lys Ile Ile Lys Thr Asp Pro Asn Asn Ser Leu Phe Lys Gly Met
 35 40 45

Thr Asp Leu Asn Asn Arg Asp Phe Asp Pro Phe Gly Asp Phe Phe Asn
 50 55 60

Asp Leu Asn Asn Phe Arg Pro Ser Ser Asn Thr Pro Pro Ile Pro Pro
 65 70 75 80

Thr Gln Ser Gly Gly Gly Tyr Gly Gly Asn Gly Gly Tyr Gly Ser Gln
 85 90 95

Asn Arg Gly Ser Ala Gln Thr Pro Pro Pro Ser Gln Glu Lys Gly Leu
 100 105 110

Leu Glu Glu Phe Gly Ile Asn Val Thr Glu Ile Ala Arg Arg Gly Asp
 115 120 125

Ile Asp Pro Val Ile Gly Arg Asp Asp Glu Ile Ile Arg Val Ile Glu
 130 135 140

Ile Leu Asn Arg Arg Thr Lys Asn Asn Pro Val Leu Ile Gly Glu Pro
 145 150 155 160

Gly Val Gly Lys Thr Ala Val Val Glu Gly Leu Ala Gln Lys Ile Val
 165 170 175

Asp Gly Asp Val Pro His Lys Leu Gln Gly Lys Gln Val Ile Arg Leu
 180 185 190

Asp Val Val Ser Leu Val Gln Gly Thr Gly Ile Arg Gly Gln Phe Glu
 195 200 205
 Glu Arg Met Gln Lys Leu Met Glu Glu Ile Arg Lys Arg Glu Asp Ile
 210 215 220
 Ile Leu Phe Ile Asp Glu Ile His Glu Ile Val Gly Ala Gly Ser Ala
 225 230 235 240
 Ser Asp Gly Asn Met Asp Ala Gly Asn Ile Leu Lys Pro Ala Leu Ala
 245 250 255
 Arg Gly Glu Leu Gln Leu Val Gly Ala Thr Thr Leu Asn Glu Tyr Arg
 260 265 270
 Ile Ile Glu Lys Asp Ala Ala Leu Glu Arg Arg Met Gln Pro Val Lys
 275 280 285
 Val Asp Glu Pro Thr Val Asp Glu Thr Ile Thr Ile Leu Lys Gly Ile
 290 295 300
 Gln Lys Lys Tyr Glu Asp Tyr His His Val Gln Tyr Thr Asp Ala Ala
 305 310 315 320
 Ile Glu Ala Ala Ala Thr Leu Ser Asn Arg Tyr Ile Gln Asp Arg Phe
 325 330 335
 Leu Pro Asp Lys Ala Ile Asp Leu Leu Asp Glu Ala Gly Ser Lys Met
 340 345 350
 Asn Leu Thr Leu Asn Phe Val Asp Pro Lys Val Ile Asp Gln Arg Leu
 355 360 365
 Ile Glu Ala Glu Asn Leu Lys Ser Gln Ala Thr Arg Glu Glu Asp Phe
 370 375 380
 Glu Lys Ala Ala Tyr Phe Arg Asp Gln Ile Ala Lys Tyr Lys Glu Met
 385 390 395 400
 Gln Lys Lys Lys Ile Thr Asp Gln Asp Thr Pro Ser Ile Ser Glu Lys

405	410	415
Thr Ile Glu His Ile Ile Glu Gln Lys Thr Asn Ile Pro Val Gly Asp 420 425 430		
Leu Lys Glu Lys Glu Gln Ser Gln Leu Ile His Leu Ala Glu Asp Leu 435 440 445		
Lys Ser His Val Ile Gly Gln Asp Asp Ala Val Asp Lys Ile Ala Lys 450 455 460		
Ala Ile Arg Arg Asn Arg Val Gly Leu Gly Thr Pro Asn Arg Pro Ile 465 470 475 480		
Gly Ser Phe Leu Phe Val Gly Pro Thr Gly Val Gly Lys Thr Glu Leu 485 490 495		
Ser Lys Gln Leu Ala Ile Glu Leu Phe Gly Ser Ala Asp Ser Met Ile 500 505 510		
Arg Phe Asp Met Ser Glu Tyr Met Glu Lys His Ser Val Ala Lys Leu 515 520 525		
Val Gly Ala Pro Pro Gly Tyr Val Gly Tyr Asp Glu Ala Gly Gln Leu 530 535 540		
Thr Glu Lys Val Arg His Asn Pro Tyr Ser Leu Ile Leu Leu Asp Glu 545 550 555 560		
Val Glu Lys Ala His Pro Asp Val Met His Met Phe Leu Gln Val Leu 565 570 575		
Asp Asp Gly Arg Leu Thr Asp Gly Gln Gly Arg Thr Val Ser Phe Lys 580 585 590		
Asp Ala Ile Ile Ile Met Thr Ser Asn Ala Gly Thr Gly Lys Thr Glu 595 600 605		
Ala Ser Val Gly Phe Gly Ala Ala Arg Glu Gly Arg Thr Asn Ser Val 610 615 620		

Leu Gly Glu Leu Gly Asn Phe Phe Ser Pro Glu Phe Met Asn Arg Phe
625 630 635 640

Asp Gly Ile Ile Glu Phe Lys Ala Leu Ser Lys Asp Asn Leu Leu Gln
645 650 655

Ile Val Glu Leu Met Leu Ala Asp Val Asn Lys Arg Leu Ser Ser Asn
660 665 670

Asn Ile Arg Leu Asp Val Thr Asp Lys Val Lys Glu Lys Leu Val Asp
675 680 685

Leu Gly Tyr Asp Pro Lys Met Gly Ala Arg Pro Leu Arg Arg Thr Ile
690 695 700

Gln Asp Tyr Ile Glu Asp Thr Ile Thr Asp Tyr Tyr Leu Glu Asn Pro
705 710 715 720

Ser Glu Lys Asp Leu Lys Ala Val Met Thr Ser Lys Gly Asn Ile Gln
725 730 735

Ile Lys Ser Ala Lys Lys Ala Glu Val Lys Ser Ser Glu Lys Glu Lys
740 745 750

<210> 651

<211> 400

<212> PRT

<213> Streptococcus pneumoniae

<400> 651

Met Asn Glu Phe Glu Asp Leu Leu Asn Ser Val Ser Gln Val Glu Thr
1 5 10 15

Gly Asp Val Val Ser Ala Glu Val Leu Thr Val Asp Ala Thr Gln Ala
20 25 30

Asn Val Ala Ile Ser Gly Thr Gly Val Glu Gly Val Leu Thr Leu Arg
35 40 45

Glu Leu Thr Asn Asp Arg Asp Ala Asp Ile Asn Asp Phe Val Lys Val
50 55 60

Gly Glu Val Leu Asp Val Leu Val Leu Arg Gln Val Val Gly Lys Asp
 65 70 75 80

Thr Asp Thr Val Thr Tyr Leu Val Ser Lys Lys Arg Leu Glu Ala Arg
 85 90 95

Lys Ala Trp Asp Lys Leu Val Gly Arg Glu Glu Glu Val Val Thr Val
 100 105 110

Lys Gly Thr Arg Ala Val Lys Gly Gly Leu Ser Val Glu Phe Glu Gly
 115 120 125

Val Arg Gly Phe Ile Pro Ala Ser Met Leu Asp Thr Arg Phe Val Arg
 130 135 140

Asn Ala Glu Arg Phe Val Gly Gln Glu Phe Asp Thr Lys Ile Lys Glu
 145 150 155 160

Val Asn Ala Lys Glu Asn Arg Phe Ile Leu Ser Arg Arg Glu Val Val
 165 170 175

Glu Ala Ala Thr Ala Ala Ala Arg Ala Glu Val Phe Gly Lys Leu Ala
 180 185 190

Val Gly Asp Val Val Thr Gly Lys Val Ala Arg Ile Thr Ser Phe Gly
 195 200 205

Ala Phe Val Asp Leu Gly Gly Val Asp Gly Leu Val His Leu Thr Glu
 210 215 220

Leu Ser His Glu Arg Asn Val Ser Pro Lys Ser Val Val Thr Val Gly
 225 230 235 240

Glu Glu Ile Glu Val Lys Ile Leu Asp Leu Asn Glu Glu Glu Gly Arg
 245 250 255

Val Ser Leu Ser Leu Lys Ala Thr Val Pro Gly Pro Trp Asp Gly Val
 260 265 270

Glu Gln Lys Leu Ala Lys Gly Asp Val Val Glu Gly Thr Val Lys Arg
 275 280 285

Leu Thr Asp Phe Gly Ala Phe Val Glu Val Leu Pro Gly Ile Asp Gly
 290 295 300

Leu Val His Val Ser Gln Ile Ser His Lys Arg Ile Glu Asn Pro Lys
 305 310 315 320

Glu Ala Leu Lys Val Gly Gln Glu Val Gln Val Lys Val Leu Glu Val
 325 330 335

Asn Ala Asp Ala Glu Arg Val Ser Leu Ser Ile Lys Ala Leu Glu Glu
 340 345 350

Arg Pro Ala Gln Glu Glu Gly Gln Lys Glu Glu Lys Arg Ala Ala Arg
 355 360 365

Pro Arg Arg Pro Arg Arg Gln Glu Lys Arg Asp Phe Glu Leu Pro Glu
 370 375 380

Thr Gln Thr Gly Phe Ser Met Ala Asp Leu Phe Gly Asp Ile Glu Leu
 385 390 395 400

<210> 652

<211> 470

<212> PRT

<213> Streptococcus pneumoniae

<400> 652

Met Ala Glu Glu Arg Val Glu Pro Lys Pro Ile Asp Leu Gly Glu Tyr
 1 5 10 15

Lys Phe Gly Phe His Asp Asp Val Glu Pro Val Leu Ser Thr Gly Lys
 20 25 30

Gly Leu Asn Glu Gly Val Ile Arg Glu Leu Ser Ala Ala Lys Gly Glu
 35 40 45

Pro Glu Trp Met Leu Glu Phe Arg Leu Lys Ser Tyr Glu Thr Phe Lys
 50 55 60

Lys Met Pro Met Gln Thr Trp Gly Ala Asp Leu Ser Glu Ile Asp Phe
 65 70 75 80

Asp Asp Leu Ile Tyr Tyr Gln Lys Pro Ser Asp Lys Pro Ala Arg Ser
 85 90 95

Trp Asp Asp Val Pro Glu Lys Ile Lys Glu Thr Phe Glu Arg Ile Gly
 100 105 110

Ile Pro Glu Ala Glu Arg Ala Tyr Leu Ala Gly Ala Ser Ala Gln Tyr
 115 120 125

Glu Ser Glu Val Val Tyr His Asn Met Lys Glu Glu Phe Gln Lys Leu
 130 135 140

Gly Ile Ile Phe Thr Asp Thr Asp Ser Ala Leu Lys Glu Tyr Pro Asp
 145 150 155 160

Leu Phe Lys Gln Tyr Phe Ala Lys Leu Val Pro Pro Thr Asp Asn Lys
 165 170 175

Leu Ala Ala Leu Asn Ser Ala Val Trp Ser Gly Gly Thr Phe Ile Tyr
 180 185 190

Val Pro Lys Gly Val Lys Val Asp Ile Pro Leu Gln Thr Tyr Phe Arg
 195 200 205

Ile Asn Asn Glu Asn Ile Gly Gln Phe Glu Arg Thr Leu Ile Ile Val
 210 215 220

Asp Glu Gly Ala Ser Val Tyr Tyr Val Glu Gly Cys Thr Ala Pro Thr
 225 230 235 240

Tyr Ser Ser Asn Ser Leu His Ala Ala Ile Val Glu Ile Phe Ala Leu
 245 250 255

Asp Gly Ala Tyr Met Arg Tyr Thr Thr Ile Gln Asn Trp Ser Asp Asn
 260 265 270

Val Tyr Asn Leu Val Thr Lys Arg Ala Lys Ala Gln Lys Asp Ala Thr
 275 280 285

Val Glu Trp Ile Asp Gly Asn Leu Gly Ala Lys Thr Thr Met Lys Tyr
 290 295 300

Pro Ser Val Tyr Leu Asp Gly Glu Gly Ala Arg Gly Thr Met Leu Ser
 305 310 315 320
 Ile Ala Phe Ala Asn Ala Gly Gln His Gln Asp Thr Gly Ala Lys Met
 325 330 335
 Ile His Asn Ala Pro His Thr Ser Ser Ser Ile Val Ser Lys Ser Ile
 340 345 350
 Ala Lys Gly Gly Gly Lys Val Asp Tyr Arg Gly Gln Val Thr Phe Asn
 355 360 365
 Lys Asn Ser Lys Lys Ser Val Ser His Ile Glu Cys Asp Thr Ile Ile
 370 375 380
 Met Asp Asp Leu Ser Ala Ser Asp Thr Ile Pro Phe Asn Glu Ile His
 385 390 395 400
 Asn Ser Gln Val Ala Leu Glu His Glu Ala Lys Val Ser Lys Ile Ser
 405 410 415
 Glu Glu Gln Leu Tyr Tyr Leu Met Ser Arg Gly Leu Ser Glu Ser Glu
 420 425 430
 Ala Thr Glu Met Ile Val Met Gly Phe Val Glu Pro Phe Thr Lys Glu
 435 440 445
 Leu Pro Met Glu Tyr Ala Val Glu Leu Asn Arg Leu Ile Ser Tyr Glu
 450 455 460
 Met Glu Gly Ser Val Gly
 465 470
 <210> 653
 <211> 413
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 653
 Met Lys Lys Ile Phe Leu Thr Leu Leu Thr Val Ser Leu Leu Gly Gly
 1 5 10 15

Ala Ser Thr Ala Val Ala Gln Asp Phe Thr Ile Ala Ala Lys His Ala
 20 25 30

Ile Ala Val Glu Ala Asn Thr Gly Lys Ile Leu Tyr Glu Lys Asp Ala
 35 40 45

Thr Gln Pro Val Glu Ile Ala Ser Ile Thr Lys Leu Ile Thr Val Tyr
 50 55 60

Leu Val Tyr Glu Ala Leu Glu Asn Gly Ser Ile Thr Leu Ser Thr Pro
 65 70 75 80

Val Asp Ile Ser Asp Tyr Pro Tyr Gln Leu Thr Thr Asn Ser Glu Ala
 85 90 95

Ser Asn Ile Pro Met Glu Ala Arg Asn Tyr Thr Val Glu Glu Leu Leu
 100 105 110

Glu Ala Thr Leu Val Ser Ser Ala Asn Ser Ala Ala Ile Ala Leu Ala
 115 120 125

Glu Lys Ile Ala Gly Ser Glu Lys Asp Phe Val Asp Met Met Arg Ala
 130 135 140

Lys Leu Leu Glu Trp Gly Ile Gln Asp Ala Thr Val Val Asn Thr Thr
 145 150 155 160

Gly Leu Asn Asn Glu Thr Leu Gly Asp Asn Ile Tyr Pro Gly Ser Lys
 165 170 175

Lys Asp Glu Glu Asn Lys Leu Ser Ala Tyr Asp Val Ala Ile Val Ala
 180 185 190

Arg Asn Leu Ile Lys Lys Tyr Pro Gln Val Leu Glu Ile Thr Lys Lys
 195 200 205

Pro Ser Ser Thr Phe Ala Gly Met Thr Ile Thr Ser Thr Asn Tyr Met
 210 215 220

Leu Glu Gly Met Pro Ala Tyr Arg Gly Gly Phe Asp Gly Leu Lys Thr

225	230	235	240
Gly Thr Thr Asp Lys Ala Gly Glu Ser Phe Val Gly Thr Thr Val Glu			
245		250	255
Lys Gly Met Arg Val Ile Thr Val Val Leu Asn Ala Asp His Gln Asp			
260	265		270
Asn Asn Pro Tyr Ala Arg Phe Thr Ala Thr Ser Ser Leu Met Asp Tyr			
275	280		285
Ile Ser Ser Thr Phe Thr Leu Arg Lys Ile Val Gln Gln Gly Asp Ala			
290	295		300
Tyr Gln Asp Ser Lys Ala Pro Val Gln Asp Gly Lys Glu Asp Thr Val			
305	310	315	320
Thr Ala Val Ala Pro Glu Asp Ile Tyr Leu Ile Glu Arg Val Gly Asn			
	325	330	335
Gln Ser Ser Gln Ser Val Gln Phe Thr Pro Asp Ser Lys Ala Ile Pro			
	340	345	350
Ala Pro Leu Glu Ala Gly Thr Val Val Gly His Leu Thr Tyr Glu Asp			
355	360		365
Lys Asp Leu Ile Gly Gln Gly Tyr Ile Thr Thr Glu Arg Pro Ser Phe			
370	375		380
Glu Met Val Ala Asp Lys Lys Ile Glu Lys Ala Phe Phe Leu Lys Val			
385	390	395	400
Trp Trp Asn Gln Phe Val Arg Phe Val Asn Glu Lys Leu			
	405	410	
<210> 654			
<211> 335			
<212> PRT			
<213> Streptococcus pneumoniae			
<400> 654			
Met Lys Arg Ile Ala Val Leu Thr Ser Gly Gly Asp Ala Pro Gly Met			

1	5	10	15
Asn Ala Ala	Ile Arg Ala Val Val	Arg Gln Ala Ile Ser	Glu Gly Met
	20	25	30
Glu Val Phe	Gly Ile Tyr Asp	Gly Tyr Ala Gly	Met Val Ala Gly Glu
	35	40	45
Ile His Pro	Leu Asp Ala Ala	Ser Val Gly Asp	Ile Ile Ser Arg Gly
	50	55	60
Gly Thr Phe	Leu His Ser Ala	Arg Tyr Pro Glu	Phe Ala Gln Leu Glu
	65	70	75
Gly Gln Leu	Lys Gly Ile Glu	Gln Leu Lys Lys	His Gly Ile Glu Gly
	85	90	95
Val Val Val	Ile Gly Gly Asp	Gly Ser Tyr His	Gly Ala Met Arg Leu
	100	105	110
Thr Glu His	Gly Phe Pro Ala	Ile Gly Leu Pro	Gly Thr Ile Asp Asn
	115	120	125
Asp Ile Val	Gly Thr Asp Phe	Thr Ile Gly Phe	Asp Thr Ala Val Thr
	130	135	140
Thr Ala Met	Asp Ala Ile Asp	Lys Ile Arg Asp	Thr Ser Ser Ser His
	145	150	155
Arg Arg Thr	Phe Val Ile Glu	Val Met Gly Arg	Asn Ala Gly Asp Ile
	165	170	175
Ala Leu Trp	Ala Gly Ile Ala	Thr Gly Ala Asp	Glu Ile Ile Ile Pro
	180	185	190
Glu Ala Gly	Phe Lys Met Glu	Asp Ile Val Ala	Ser Ile Lys Ala Gly
	195	200	205
Tyr Glu Cys	Gly Lys Lys His	Asn Ile Ile Val	Leu Ala Glu Gly Val
	210	215	220

Met Ser Ala Ala Glu Phe Gly Gln Lys Leu Lys Glu Ala Gly Asp Thr
 225 230 235 240

Ser Asp Leu Arg Val Thr Glu Leu Gly His Ile Gln Arg Gly Gly Ser
 245 250 255

Pro Thr Ala Arg Asp Arg Val Leu Ala Ser Arg Met Gly Ala His Ala
 260 265 270

Val Lys Leu Leu Lys Glu Gly Ile Gly Gly Val Ala Val Gly Ile Arg
 275 280 285

Asn Glu Lys Met Val Glu Asn Pro Ile Leu Gly Thr Ala Glu Glu Gly
 290 295 300

Ala Leu Phe Ser Leu Thr Ala Glu Gly Lys Ile Val Val Asn Asn Pro
 305 310 315 320

His Lys Ala Asp Ile Glu Leu Ser Ser Leu Asn Lys Ser Leu Ser
 325 330 335

<210> 655

<211> 501

<212> PRT

<213> Streptococcus pneumoniae

<400> 655

Met Asn Lys Arg Val Lys Ile Val Ala Thr Leu Gly Pro Ala Val Glu
 1 5 10 15

Ile Arg Gly Gly Lys Lys Phe Gly Glu Asp Gly Tyr Trp Gly Glu Lys
 20 25 30

Leu Asp Val Glu Ala Ser Ala Lys Asn Ile Ala Lys Leu Ile Glu Ala
 35 40 45

Gly Ala Asn Thr Phe Arg Phe Asn Phe Ser His Gly Asp His Gln Glu
 50 55 60

Gln Gly Glu Arg Met Ala Thr Val Lys Leu Ala Glu Lys Ile Ala Gly
 65 70 75 80

Lys Lys Val Gly Phe Leu Leu Asp Thr Lys Gly Pro Glu Ile Arg Thr
 85 90 95
 Glu Leu Phe Glu Gly Glu Ala Lys Glu Tyr Ser Tyr Lys Thr Gly Glu
 100 105 110
 Lys Ile Arg Val Ala Thr Lys Gln Gly Ile Lys Ser Thr Arg Glu Val
 115 120 125
 Ile Ala Leu Asn Val Ala Gly Ala Leu Asp Ile Tyr Asp Asp Val Glu
 130 135 140
 Val Gly Arg Gln Val Leu Val Asp Asp Gly Lys Leu Gly Leu Arg Val
 145 150 155 160
 Val Ala Lys Asp Asp Ala Thr Arg Glu Phe Glu Val Glu Val Glu Asn
 165 170 175
 Asp Gly Ile Ile Ala Lys Gln Lys Gly Val Asn Ile Pro Asn Thr Lys
 180 185 190
 Ile Pro Phe Pro Ala Leu Ala Glu Arg Asp Asn Asp Asp Ile Arg Phe
 195 200 205
 Gly Leu Glu Gln Gly Ile Asn Phe Ile Ala Ile Ser Phe Val Arg Thr
 210 215 220
 Ala Lys Asp Val Asn Glu Val Arg Ala Ile Cys Glu Glu Thr Gly Asn
 225 230 235 240
 Gly His Val Gln Leu Phe Ala Lys Ile Glu Asn Gln Gln Gly Ile Asp
 245 250 255
 Asn Leu Asp Glu Ile Ile Glu Ala Ala Asp Gly Ile Met Ile Ala Arg
 260 265 270
 Gly Asp Met Gly Ile Glu Val Pro Phe Glu Met Val Pro Val Tyr Gln
 275 280 285
 Lys Met Ile Ile Lys Lys Val Asn Ala Ala Gly Lys Val Val Ile Thr
 290 295 300

Ala Thr Asn Met Leu Glu Thr Met Thr Glu Lys Pro Arg Ala Thr Arg
305 310 315 320

Ser Glu Val Ser Asp Val Phe Asn Ala Val Ile Asp Gly Thr Asp Ala
325 330 335

Thr Met Leu Ser Ser Gly Glu Ser Ala Asn Gly Lys Tyr Pro Leu Glu Ser
340 345 350

Val Thr Thr Met Ala Thr Ile Asp Lys Asn Ala Gln Ala Leu Leu Asn
355 360 365

Glu Tyr Gly Arg Leu Asp Ser Asp Ser Phe Glu Arg Asn Ser Lys Thr
370 375 380

Glu Val Met Ala Ser Ala Val Lys Asp Ala Thr Ser Ser Met Asp Ile
385 390 395 400

Lys Leu Val Val Thr Leu Thr Lys Thr Gly His Thr Ala Arg Leu Ile
405 410 415

Ser Lys Tyr Arg Pro Asn Ala Asp Ile Leu Ala Leu Thr Phe Asp Glu
420 425 430

Leu Thr Glu Arg Gly Leu Met Leu Asn Trp Gly Val Ile Pro Met Leu
435 440 445

Thr Asp Ala Pro Ser Ser Thr Asp Asp Met Phe Glu Ile Ala Glu Arg
450 455 460

Lys Ala Val Glu Ala Gly Leu Val Glu Ser Gly Asp Asp Ile Val Ile
465 470 475 480

Val Ala Gly Val Pro Val Gly Glu Ala Val Arg Thr Asn Thr Met Arg
485 490 495

Ile Arg Thr Val Arg
500

<210> 656

<211> 491

<212> PRT
 <213> Streptococcus pneumoniae
 <400> 656
 Met Lys Glu Leu Asp Gln Asn Gln Ala Pro Ile Tyr Glu Ala Leu Val
 1 5 10 15
 Lys Leu Arg Lys Lys Arg Ile Val Pro Phe Asp Val Pro Gly His Lys
 20 25 30
 Arg Gly Arg Gly Asn Pro Glu Leu Val Glu Leu Leu Gly Glu Lys Cys
 35 40 45
 Val Gly Ile Asp Val Asn Ser Met Lys Pro Leu Asp Asn Leu Gly His
 50 55 60
 Pro Ile Ser Ile Ile Arg Asp Ala Glu Glu Leu Ala Ala Asp Ala Phe
 65 70 75 80
 Gly Ala Ser His Ala Phe Leu Met Ile Gly Gly Thr Thr Ser Ser Val
 85 90 95
 Gln Thr Met Ile Leu Ala Thr Cys Lys Ala Gly Asp Lys Ile Ile Leu
 100 105 110
 Pro Arg Asn Val His Lys Ser Ala Ile Asn Ala Leu Val Leu Cys Gly
 115 120 125
 Ala Ile Pro Ile Tyr Ile Glu Met Ser Val Asp Pro Lys Ile Gly Ile
 130 135 140
 Ala Leu Gly Leu Glu Asn Asp Arg Val Ala Gln Ala Ile Lys Asp His
 145 150 155 160
 Pro Asp Ala Lys Ala Ile Leu Ile Asn Asn Pro Thr Tyr Tyr Gly Ile
 165 170 175
 Cys Ser Asp Leu Lys Gly Leu Thr Glu Met Ala His Glu Ala Gly Met
 180 185 190
 Met Val Leu Val Asp Glu Ala His Gly Ala His Leu His Phe Thr Asp
 195 200 205

Lys Leu Pro Ile Ser Ala Met Asp Ala Gly Ala Asp Met Ala Ala Val
 210 215 220
 Ser Met His Lys Ser Gly Gly Ser Leu Thr Gln Ser Ser Ile Leu Leu
 225 230 235 240
 Ile Gly Glu Gln Met Asn Ser Glu Tyr Val Arg Gln Ile Ile Asn Leu
 245 250 255
 Thr Gln Ser Thr Ser Ala Ser Tyr Leu Leu Met Ala Ser Leu Asp Ile
 260 265 270
 Ser Arg Arg Asn Leu Ala Leu Arg Gly Lys Glu Ser Phe Glu Lys Val
 275 280 285
 Ile Glu Leu Ser Glu Tyr Ala Arg Arg Glu Ile Asn Ala Ile Gly Gly
 290 295 300
 Tyr Tyr Ala Tyr Ser Lys Glu Leu Ile Asp Gly Val Ser Val Cys Asp
 305 310 315 320
 Phe Asp Val Thr Lys Leu Ser Val Tyr Thr Gln Gly Ile Gly Leu Thr
 325 330 335
 Gly Ile Glu Val Tyr Asp Leu Leu Arg Asp Glu Tyr Asp Ile Gln Ile
 340 345 350
 Glu Phe Gly Asp Ile Gly Asn Ile Leu Ala Tyr Ile Ser Ile Gly Asp
 355 360 365
 Arg Ile Gln Asp Ile Glu Arg Leu Val Gly Ala Leu Ala Asp Ile Lys
 370 375 380
 Arg Leu Tyr Ser Arg Asp Gly Lys Asp Leu Ile Ala Gly Glu Tyr Ile
 385 390 395 400
 Gln Pro Glu Leu Val Leu Ser Pro Gln Glu Ala Phe Tyr Ser Glu Arg
 405 410 415
 Lys Ser Leu Thr Leu Asp Asp Ser Val Gly Gln Val Cys Gly Glu Phe

420 425 430
 Val Met Cys Tyr Pro Pro Gly Ile Pro Ile Leu Ala Pro Gly Glu Arg
 435 440 445
 Ile Thr Arg Glu Ile Val Asp Tyr Ile Gln Phe Ala Lys Glu Arg Gly
 450 455 460
 Cys Ser Leu Gln Gly Thr Glu Asp Pro Glu Val Asn His Ile Asn Val
 465 470 475 480
 Ile Lys Arg Lys Thr Asn Tyr Lys Lys Ser Gln
 485 490

 <210> 657
 <211> 286
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 657
 Met Asp Leu Trp Phe Ser Glu Val His Thr Pro Asp Val Lys Leu Ser
 1 5 10 15

 Leu Arg Thr Ala Lys Gln Leu Tyr Ala Gly Lys Ser Glu Trp Gln Asp
 20 25 30

 Ile Glu Val Leu Asp Thr Pro Ala Phe Gly Lys Ile Leu Ile Leu Asn
 35 40 45

 Gly His Val Leu Phe Ser Asp Ala Asp Asp Phe Val Tyr Asn Glu Met
 50 55 60

 Thr Val His Val Pro Met Ala Val His Pro Asn Pro Lys Lys Val Leu
 65 70 75 80

 Val Ile Gly Gly Gly Asp Gly Gly Val Ala Gln Val Leu Thr Leu Tyr
 85 90 95

 Pro Glu Leu Glu Gln Ile Asp Ile Val Glu Pro Asp Glu Met Leu Val
 100 105 110

 Glu Val Cys Arg Glu Tyr Phe Pro Asp Phe Ala Ala Gly Leu Asp Asp

115	120	125
Pro Arg Val Thr Ile Tyr Tyr Gln Asn Gly Leu Arg Phe Leu Arg Asn		
130	135	140
Cys Glu Asp Asp Tyr Asp Ile Ile Ile Asn Asp Ala Thr Asp Pro Phe		
145	150	155
Gly His Thr Glu Gly Leu Phe Thr Lys Glu Phe Tyr Gly Asn Ser Tyr		
165	170	175
Arg Ala Leu Lys Glu Asp Gly Ile Met Ile Tyr Gln His Gly Ser Pro		
180	185	190
Phe Phe Asp Glu Asp Glu Ser Ala Cys Arg Ser Met His Arg Lys Val		
195	200	205
Asn Gln Ala Phe Pro Ile Ser Arg Val Tyr Gln Ala His Ile Pro Thr		
210	215	220
Ser Pro Ala Gly Tyr Trp Leu Phe Gly Phe Ala Ser Lys Lys Tyr His		
225	230	235
Pro Val Lys Asp Phe Asp Lys Glu Gly Trp Lys Lys Arg Gln Leu Phe		
245	250	255
Thr Glu Tyr Tyr Thr Ala Asn Leu His Val Gly Ala Phe Met Leu Pro		
260	265	270
Lys Tyr Val Glu Asp Ile Leu Glu Glu Glu Glu Gly Lys Lys		
275	280	285

<210> 658
 <211> 291
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 658

Met Arg Asn Val Arg Val Ala Thr Ile Gln Met Gln Cys Ala Lys Asp
1 5 10 15

Val Ala Thr Asn Ile Gln Thr Ala Glu Arg Leu Val Arg Gln Ala Ala

	20		25		30	
Glu Gln Gly Ala Gln Ile Ile Leu Leu Pro Glu Leu Phe Glu His Pro	35		40		45	
Tyr Phe Cys Gln Glu Arg Gln Tyr Asp Tyr Tyr Gln Tyr Ala Gln Ser	50		55		60	
Val Ala Glu Asn Thr Ala Ile Gln His Phe Lys Val Ile Ala Lys Glu	65	70		75		80
Leu Gln Val Val Leu Pro Ile Ser Phe Tyr Glu Lys Asp Gly Asn Val		85		90		95
Leu Tyr Asn Ser Ile Ala Val Ile Asp Ala Asp Gly Glu Val Leu Gly		100		105		110
Val Tyr Arg Lys Thr His Ile Pro Asp Asp His Tyr Tyr Gln Glu Lys		115		120		125
Phe Tyr Phe Thr Pro Gly Asn Thr Gly Phe Lys Val Trp Asn Thr Arg		130		135		140
Tyr Ala Lys Ile Gly Ile Gly Ile Cys Trp Asp Gln Trp Phe Pro Glu	145		150		155	160
Thr Ala Arg Cys Leu Ala Leu Asn Gly Ala Glu Leu Leu Phe Tyr Pro		165		170		175
Thr Ala Ile Gly Ser Glu Pro Ile Leu Asp Thr Asp Ser Cys Gly His		180		185		190
Trp Gln Arg Thr Met Gln Gly His Ala Ala Ala Asn Ile Val Pro Val		195		200		205
Ile Ala Ala Asn Arg Tyr Gly Leu Glu Glu Val Thr Pro Ser Glu Glu		210		215		220
Asn Gly Gly Gln Ser Ser Ser Leu Asp Phe Tyr Gly Ser Ser Phe Met	225		230		235	240

Thr Asp Glu Thr Gly Ala Ile Leu Glu Arg Ala Glu Arg Gln Glu Glu
245 250 255

Ala Val Leu Leu Ala Thr Tyr Asp Leu Asp Lys Gly Ala Ser Glu Arg
260 265 270

Leu Asn Trp Gly Leu Phe Arg Asp Arg Arg Pro Glu Met Tyr Arg Gln
275 280 285

Ile Thr Asp
290

<210> 659
<211> 119
<212> PRT
<213> Streptococcus pneumoniae

<400> 659

Met Ala Arg Val Lys Gly Gly Val Val Ser Arg Lys Arg Arg Lys Arg
1 5 10 15

Ile Leu Lys Leu Ala Lys Gly Tyr Tyr Gly Ala Lys His Ile Leu Phe
20 25 30

Arg Thr Ala Lys Glu Gln Val Met Asn Ser Tyr Tyr Tyr Ala Tyr Arg
35 40 45

Asp Arg Arg Gln Lys Lys Arg Asp Phe Arg Lys Leu Trp Ile Thr Arg
50 55 60

Ile Asn Ala Ala Ala Arg Met Asn Gly Leu Ser Tyr Ser Gln Leu Met
65 70 75 80

His Gly Leu Lys Leu Ala Glu Ile Glu Val Asn Arg Lys Met Leu Ala
85 90 95

Asp Leu Ala Val Asn Asp Ala Val Ala Phe Thr Ala Leu Ala Asp Ala
100 105 110

Ala Lys Ala Lys Leu Gly Lys
115

<210> 660
 <211> 181
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 660
 Met Glu Phe Glu Glu Lys Thr Leu Ser Arg Lys Glu Ile Tyr Gln Gly
 1 5 10 15
 Pro Ile Phe Lys Leu Val Gln Asp Gln Val Glu Leu Pro Glu Gly Lys
 20 25 30
 Gly Thr Ala Gln Arg Asp Leu Ile Phe His Asn Gly Ala Val Cys Val
 35 40 45
 Leu Ala Val Thr Asp Glu Gln Lys Leu Ile Leu Val Lys Gln Tyr Arg
 50 55 60
 Lys Ala Ile Glu Ala Val Ser Tyr Glu Ile Pro Ala Gly Lys Leu Glu
 65 70 75 80
 Val Gly Glu Asn Thr Ala Pro Val Ala Ala Ala Leu Arg Glu Leu Glu
 85 90 95
 Glu Glu Thr Ala Tyr Thr Gly Lys Leu Glu Leu Leu Tyr Asp Phe Tyr
 100 105 110
 Ser Ala Ile Gly Phe Cys Asn Glu Lys Leu Lys Leu Tyr Leu Ala Ser
 115 120 125
 Asp Leu Thr Lys Val Glu Asn Pro Arg Pro Gln Asp Glu Asp Glu Thr
 130 135 140
 Leu Glu Val Leu Glu Val Ser Leu Glu Glu Ala Lys Glu Leu Ile Gln
 145 150 155 160
 Ser Gly His Ile Cys Asp Ala Lys Thr Ile Met Ala Val Gln Tyr Trp
 165 170 175
 Glu Leu Gln Lys Lys
 180

<210> 661
 <211> 191
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 661

 Met Asn Lys Gly Gly Gln Met Lys Lys Val Met Phe Ala Gly Leu Ser
 1 5 10 15

 Leu Leu Ser Leu Val Val Leu Met Ala Cys Gly Glu Glu Glu Thr Lys
 20 25 30

 Lys Thr Gln Ala Ala Gln Gln Pro Lys Gln Gln Thr Thr Val Gln Gln
 35 40 45

 Ile Ala Val Gly Lys Asp Ala Pro Asp Phe Thr Leu Gln Ser Met Asp
 50 55 60

 Gly Lys Glu Val Lys Leu Ser Asp Phe Lys Gly Lys Lys Val Tyr Leu
 65 70 75 80

 Lys Phe Trp Ala Ser Trp Cys Gly Pro Cys Lys Lys Ser Met Pro Glu
 85 90 95

 Leu Met Glu Leu Ala Ala Lys Pro Asp Arg Asp Phe Glu Ile Leu Thr
 100 105 110

 Val Ile Ala Pro Gly Ile Gln Gly Glu Lys Thr Val Glu Gln Phe Pro
 115 120 125

 Gln Trp Phe Gln Glu Gln Gly Tyr Lys Asp Ile Pro Val Leu Tyr Asp
 130 135 140

 Thr Lys Ala Thr Thr Phe Gln Ala Tyr Gln Ile Arg Ser Ile Pro Thr
 145 150 155 160

 Glu Tyr Leu Ile Asp Ser Gln Gly Lys Ile Gly Lys Ile Gln Phe Gly
 165 170 175

 Ala Ile Ser Asn Ala Asp Ala Glu Ala Ala Phe Lys Glu Met Asn
 180 185 190

<210> 662

<211> 418

<212> PRT

<213> Streptococcus pneumoniae

<400> 662

Met Ile Phe Asp Lys Asp Asp Phe Lys Ala Tyr Asp Ala Asp Leu Trp
 1 5 10 15

Asn Ala Ile Ala Lys Glu Glu Glu Arg Gln Gln Asn Asn Ile Glu Leu
 20 25 30

Ile Ala Ser Glu Asn Val Val Ser Lys Ala Val Met Ala Ala Gln Gly
 35 40 45

Ser Ile Leu Thr Asn Lys Tyr Ala Glu Gly Tyr Pro Gly Arg Arg Tyr
 50 55 60

Tyr Gly Gly Thr Asp Val Val Asp Val Val Glu Thr Leu Ala Ile Glu
 65 70 75 80

Arg Ala Lys Glu Ile Phe Gly Ala Lys Phe Ala Asn Val Gln Pro His
 85 90 95

Ser Gly Ser Gln Ala Asn Cys Ala Ala Tyr Met Ser Leu Ile Glu Pro
 100 105 110

Gly Asp Thr Val Met Gly Met Asp Leu Ala Ser Gly Gly His Leu Thr
 115 120 125

His Gly Ala Pro Val Ser Phe Ser Gly Gln Thr Tyr Asn Phe Val Ser
 130 135 140

Tyr Ser Val Asp Pro Lys Thr Glu Leu Leu Asp Phe Asp Ala Ile Leu
 145 150 155 160

Lys Gln Ala Gln Glu Val Lys Pro Lys Leu Ile Val Ala Gly Ala Ser
 165 170 175

Ala Tyr Ser Gln Ile Ile Asp Phe Ser Lys Phe Arg Glu Ile Ala Asp
 180 185 190

Ala Val Gly Ala Lys Leu Met Val Asp Met Ala His Ile Ala Gly Leu
 195 200 205

Val Ala Ala Gly Leu His Pro Ser Pro Val Pro Tyr Ala His Ile Thr
 210 215 220

Thr Thr Thr Thr His Lys Thr Leu Arg Gly Pro Arg Gly Gly Leu Ile
 225 230 235 240

Leu Thr Asn Asp Glu Glu Leu Ala Lys Lys Ile Asn Ser Ala Ile Phe
 245 250 255

Pro Gly Ile Gln Gly Gly Pro Leu Glu His Val Val Ala Ala Lys Ala
 260 265 270

Val Ser Phe Lys Glu Val Leu Asp Pro Ala Phe Lys Glu Tyr Ala Ala
 275 280 285

Asn Val Ile Lys Asn Ser Lys Ala Met Ala Asp Val Phe Leu Gln Asp
 290 295 300

Pro Asp Phe Arg Ile Ile Ser Gly Gly Thr Glu Asn His Leu Phe Leu
 305 310 315 320

Val Asp Val Thr Lys Val Val Glu Asn Gly Lys Val Ala Gln Asn Leu
 325 330 335

Leu Asp Glu Val Asn Ile Thr Leu Asn Lys Asn Ser Ile Pro Tyr Glu
 340 345 350

Ser Leu Ser Pro Phe Lys Thr Ser Gly Ile Arg Ile Gly Ala Ala Ala
 355 360 365

Ile Thr Ala Arg Gly Phe Gly Glu Glu Glu Ser Arg Lys Val Ala Glu
 370 375 380

Leu Ile Ile Lys Thr Leu Lys Asn Ser Glu Asn Glu Ala Val Leu Glu
 385 390 395 400

Glu Val Arg Ser Ala Val Lys Glu Leu Thr Asp Ala Phe Pro Leu Tyr
 405 410 415

Glu Asp

<210> 663
 <211> 341
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 663

Met Lys Asn Lys Phe Phe Leu Ile Ala Ile Leu Ala Met Cys Ile Val
 1 5 10 15

Phe Ser Ala Cys Ser Ser Asn Ser Val Lys Asn Glu Glu Asn Thr Ser
 20 25 30

Lys Glu His Ala Pro Asp Lys Ile Val Leu Asp His Ala Phe Gly Gln
 35 40 45

Thr Ile Leu Asp Lys Lys Pro Glu Arg Val Ala Thr Ile Ala Trp Gly
 50 55 60

Asn His Asp Val Ala Leu Ala Leu Gly Ile Val Pro Val Gly Phe Ser
 65 70 75 80

Lys Ala Asn Tyr Gly Val Ser Ala Asp Lys Gly Val Leu Pro Trp Thr
 85 90 95

Glu Glu Lys Ile Lys Glu Leu Asn Gly Lys Ala Asn Leu Phe Asp Asp
 100 105 110

Leu Asp Gly Leu Asn Phe Glu Ala Ile Ser Asn Ser Lys Pro Asp Val
 115 120 125

Ile Leu Ala Gly Tyr Ser Gly Ile Thr Lys Glu Asp Tyr Asp Thr Leu
 130 135 140

Ser Lys Ile Ala Pro Val Ala Ala Tyr Lys Ser Lys Pro Trp Gln Thr
 145 150 155 160

Leu Trp Arg Asp Met Ile Lys Ile Asp Ser Lys Ala Leu Gly Met Glu
 165 170 175

Lys Glu Gly Asp Glu Leu Ile Lys Asn Thr Glu Ala Arg Ile Ser Lys
 180 185 190

Glu Leu Glu Lys His Pro Glu Ile Lys Gly Lys Ile Lys Gly Lys Lys
 195 200 205

Val Leu Phe Thr Met Ile Asn Ala Ala Asp Thr Ser Lys Phe Trp Ile
 210 215 220

Tyr Thr Ser Lys Asp Pro Arg Ala Asn Tyr Leu Thr Asp Leu Gly Leu
 225 230 235 240

Val Phe Pro Glu Ser Leu Lys Glu Phe Glu Ser Glu Asp Ser Phe Ala
 245 250 255

Lys Glu Ile Ser Ala Glu Glu Ala Asn Lys Ile Asn Asp Ala Asp Val
 260 265 270

Ile Ile Thr Tyr Gly Asp Asp Lys Thr Leu Glu Ala Leu Gln Lys Asp
 275 280 285

Pro Leu Leu Gly Lys Ile Asn Ala Ile Lys Asn Gly Ala Val Ala Val
 290 295 300

Ile Pro Asp Asn Thr Pro Leu Ala Ala Ser Cys Thr Pro Thr Pro Leu
 305 310 315 320

Ser Ile Asn Tyr Thr Ile Glu Glu Tyr Leu Asn Leu Leu Gly Asn Ala
 325 330 335

Cys Lys Asn Ala Lys
 340

<210> 664

<211> 898

<212> PRT

<213> Streptococcus pneumoniae

<400> 664

Met Ser Leu Gln Lys Leu Glu Asn Tyr Ser Asn Lys Ser Val Val Gln
 1 5 10 15

Glu Glu Val Leu Ile Leu Thr Glu Leu Leu Asp Ile Thr Lys Leu
20 25 30

Met Leu Ala Pro Glu Thr Phe Glu Lys Ile Ile Gln Leu Lys Glu Leu
35 40 45

Ser Thr Gln Glu Asp Tyr Gln Gly Leu Asn Arg Leu Val Thr Ser Leu
50 55 60

Ser Asn Asp Glu Met Val Tyr Ile Ser Arg Tyr Phe Ser Ile Leu Pro
65 70 75 80

Leu Leu Ile Asn Ile Ser Glu Asp Val Asp Leu Ala Tyr Glu Ile Asn
85 90 95

His Gln Asn Asn Ile Asp Gln Asp Tyr Leu Gly Lys Leu Ser Thr Thr
100 105 110

Ile Lys Leu Val Ala Glu Lys Glu Asn Ala Val Glu Ile Leu Glu His
115 120 125

Leu Asn Val Val Pro Val Leu Thr Ala His Pro Thr Gln Val Gln Arg
130 135 140

Lys Ser Met Leu Asp Leu Thr Asn His Ile His Ser Leu Leu Arg Lys
145 150 155 160

Tyr Arg Asp Val Lys Leu Gly Leu Ile Asn Lys Asp Lys Trp Tyr Asn
165 170 175

Asp Leu Arg Arg Tyr Ile Glu Ile Ile Met Gln Thr Asp Met Ile Arg
180 185 190

Glu Lys Lys Leu Lys Val Thr Asn Glu Ile Thr Asn Ala Met Glu Tyr
195 200 205

Tyr Asn Ser Ser Phe Leu Lys Ala Val Pro His Leu Thr Thr Glu Tyr
210 215 220

Lys Arg Leu Ala Gln Ala His Gly Leu Asn Leu Lys Gln Ala Lys Pro
225 230 235 240

Ile Thr Met Gly Met Trp Ile Gly Gly Asp Arg Asp Gly Asn Pro Phe
 245 250 255

Val Thr Ala Lys Thr Leu Lys Gln Ser Ala Leu Thr Gln Cys Glu Val
 260 265 270

Ile Met Asn Tyr Tyr Asp Lys Lys Ile Tyr Gln Leu Tyr Arg Glu Phe
 275 280 285

Ser Leu Ser Thr Ser Ile Val Asn Val Ser Lys Gln Val Arg Glu Met
 290 295 300

Ala Arg Gln Ser Lys Asp Asn Ser Ile Tyr Arg Glu Lys Glu Leu Tyr
 305 310 315 320

Arg Arg Ala Leu Phe Asp Ile Gln Ser Lys Ile Gln Ala Thr Lys Thr
 325 330 335

Tyr Leu Ile Glu Asp Glu Glu Val Gly Thr Arg Tyr Glu Thr Ala Asn
 340 345 350

Asp Phe Tyr Lys Asp Leu Ile Ala Ile Arg Asp Ser Leu Leu Glu Asn
 355 360 365

Lys Gly Glu Ser Leu Ile Ser Gly Asp Phe Val Glu Leu Leu Gln Ala
 370 375 380

Val Glu Ile Phe Gly Phe Tyr Leu Ala Ser Ile Asp Met Arg Gln Asp
 385 390 395 400

Ser Ser Val Tyr Glu Ala Cys Val Ala Glu Leu Leu Lys Ser Ala Gly
 405 410 415

Ile His Ser Arg Tyr Ser Glu Leu Ser Glu Glu Glu Lys Cys Asp Leu
 420 425 430

Leu Leu Lys Glu Leu Glu Glu Asp Pro Arg Ile Leu Ser Ala Thr His
 435 440 445

Ala Glu Lys Ser Glu Leu Leu Ala Lys Glu Leu Ala Ile Phe Lys Thr

450	455	460
Ala Arg Val Leu Lys Asp	Lys Leu Gly Asp	Asp Val Ile Arg Gln Thr
465	470	475 480
Ile Ile Ser His Ala Thr	Ser Leu Ser Asp	Met Leu Glu Leu Ala Ile
	485	490 495
Leu Leu Lys Glu Val Gly	Leu Val Asp Thr	Glu Arg Ala Arg Val Gln
	500	505 510
Ile Val Pro Leu Phe Glu	Thr Ile Glu Asp	Leu Asp His Ser Glu Glu
	515	520 525
Thr Met Arg Lys Tyr Leu	Ser Leu Ser Leu Ala	Lys Lys Trp Ile Asp
	530	535 540
Ser Arg Asn Asn Tyr Gln	Glu Ile Met Leu Gly	Tyr Ser Asp Ser Asn
545	550	555 560
Lys Asp Gly Gly Tyr Leu	Ser Ser Cys Trp	Thr Leu Tyr Lys Ala Gln
	565	570 575
Gln Gln Leu Thr Ala Ile	Gly Asp Glu Phe Gly	Val Lys Val Thr Phe
	580	585 590
Phe His Gly Arg Gly Gly	Thr Val Gly Arg Gly	Gly Gly Pro Thr Tyr
	595	600 605
Glu Ala Ile Thr Ser Gln	Pro Leu Lys Ser Ile	Lys Asp Arg Ile Arg
	610	615 620
Leu Thr Glu Gln Gly Glu	Val Ile Gly Asn Lys	Tyr Gly Asn Lys Asp
625	630	635 640
Ala Ala Tyr Tyr Asn Leu	Glu Met Leu Val Ser	Ala Ala Ile Asn Arg
	645	650 655
Met Ile Thr Gln Lys Lys	Ser Asp Thr Asn Thr	Pro Asn Arg Tyr Glu
	660	665 670

Thr Ile Met Asp Gln Val Val Asp Arg Ser Tyr Asp Ile Tyr Arg Asp
 675 680 685

Leu Val Phe Gly Asn Glu His Phe Tyr Asp Tyr Phe Phe Glu Ser Ser
 690 695 700

Pro Ile Lys Ala Ile Ser Ser Phe Asn Ile Gly Ser Arg Pro Ala Ala
 705 710 715 720

Arg Lys Thr Ile Thr Glu Ile Gly Gly Leu Arg Ala Ile Pro Trp Val
 725 730 735

Phe Ser Trp Ser Gln Ser Arg Val Met Phe Pro Gly Trp Tyr Gly Val
 740 745 750

Gly Ser Ser Phe Lys Glu Phe Ile Asn Lys Asn Pro Glu Asn Ile Ala
 755 760 765

Ile Leu Arg Asp Met Tyr Gln Asn Trp Pro Phe Phe Gln Ser Leu Leu
 770 775 780

Ser Asn Val Asp Met Val Leu Ser Lys Ser Asn Met Asn Ile Ala Phe
 785 790 795 800

Glu Tyr Ala Lys Leu Cys Glu Asp Glu Gln Val Lys Ala Ile Tyr Glu
 805 810 815

Thr Ile Leu Asn Glu Trp Gln Val Thr Lys Asn Val Ile Leu Ala Ile
 820 825 830

Glu Gly His Asp Glu Leu Leu Ala Asp Asn Pro Tyr Leu Lys Ala Ser
 835 840 845

Leu Asp Tyr Arg Met Pro Tyr Phe Asn Ile Leu Asn Tyr Ile Gln Leu
 850 855 860

Glu Leu Ile Lys Arg Gln Arg Arg Gly Glu Leu Ser Ser Asp Gln Glu
 865 870 875 880

Arg Leu Ile His Ile Thr Ile Asn Gly Ile Ala Thr Gly Leu Arg Asn
 885 890 895

Ser Gly

<210> 665
 <211> 115
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 665

Met Ala Phe Glu Lys Ile Ile Gln Leu Lys Asn Cys Arg Tyr Asp Tyr
 1 5 10 15

Thr Leu Ser Pro Ser Val Lys Lys Phe Thr Leu Lys Asp Asn Thr Phe
 20 25 30

Phe Glu Thr Lys Val Gly Asn Tyr Glu Leu Thr Arg Leu Leu Glu Lys
 35 40 45

Val Pro Asn Ser Gly Glu Gly Phe Gln Leu Lys Ile Ile Ile Asn Lys
 50 55 60

Glu Leu Thr Gly Ala Lys Ile Asn Ile Thr Asp Lys Phe Gly Leu Arg
 65 70 75 80

Leu Val Asp Ile Phe Lys Ser Glu Asp His His Ile His Gln Glu Lys
 85 90 95

Phe Tyr Phe Leu Met Asp Ser Leu Val Glu Arg Gly Val Phe Thr Lys
 100 105 110

Ser Glu Arg
 115

<210> 666
 <211> 319
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 666

Met Ser Asp Arg Lys Asn Met Lys Leu Phe Ala Leu Asn Ser Asn Gln
 1 5 10 15

Glu Ile Ala Gln Lys Ile Ala Gln Ala Val Gly Val Pro Leu Gly Lys
 20 25 30

Leu Ser Ser Arg Gln Phe Ser Asp Gly Glu Ile Gln Val Asn Ile Glu
 35 40 45

Glu Ser Val Arg Gly Tyr Asp Val Tyr Ile Ile Gln Ser Thr Ser Phe
 50 55 60

Pro Val Asn Asn His Leu Met Glu Leu Leu Ile Met Val Asp Ala Cys
 65 70 75 80

Val Arg Ala Ser Ala His Ser Ile Asn Val Val Leu Pro Tyr Phe Gly
 85 90 95

Tyr Ala Arg Gln Asp Arg Ile Ala Cys Pro Arg Glu Pro Leu Thr Ala
 100 105 110

Lys Leu Val Ala Asn Met Leu Val Lys Ala Gly Val Asp Arg Ile Leu
 115 120 125

Thr Leu Asp Leu His Ala Val Gln Val Gln Gly Phe Phe Asp Ile Pro
 130 135 140

Val Asp Asn Leu Phe Thr Val Pro Leu Phe Ala Lys His Tyr Cys Asp
 145 150 155 160

Lys Gly Leu Leu Gly Ser Asp Val Val Val Val Ser Pro Lys Asn Ser
 165 170 175

Gly Val Lys Arg Ala Arg Ser Leu Ala Glu Tyr Leu Asp Ala Pro Ile
 180 185 190

Ala Ile Ile Asp Tyr Pro Gln Asp Asp Ala Thr Arg Asn Glu Gly Tyr
 195 200 205

Ile Ile Gly Asp Val Glu Gly Lys Lys Ala Ile Leu Ile Asp Asp Ile
 210 215 220

Leu Asn Thr Gly Arg Thr Phe Ser Glu Ala Ser Lys Ile Val Glu Arg
 225 230 235 240

Glu Gly Ala Thr Glu Ile Tyr Ala Val Ser Ser His Gly Leu Phe Val
245 250 255

Glu Gly Ala Ala Glu Leu Leu Asp Asn Thr Asn Ile Lys Glu Ile Leu
260 265 270

Val Thr Asp Ser Val Ala Thr Lys Glu Lys Thr Pro Lys Asn Val Cys
275 280 285

Tyr Ile Thr Ala Ser Glu Leu Ile Gly Asp Ala Ile Val Arg Ile His
290 295 300

Glu Arg Lys Pro Val Ser Pro Leu Phe Ala Tyr Asn Lys Lys Lys
305 310 315

<210> 667

<211> 474

<212> PRT

<213> Streptococcus pneumoniae

<400> 667

Met Thr Arg Tyr Gln Asn Leu Val Asn Gly Lys Trp Lys Ser Ser Glu
1 5 10 15

Gln Glu Ile Thr Ile Tyr Ser Pro Ile Asn Gln Glu Glu Leu Gly Thr
20 25 30

Val Pro Ala Met Thr Gln Thr Glu Ala Asp Glu Ala Met Gln Ala Ala
35 40 45

Arg Ala Ala Leu Pro Ala Trp Arg Ala Leu Ser Ala Val Glu Arg Ala
50 55 60

Ala Tyr Leu His Lys Thr Ala Ala Ile Leu Glu Arg Asp Lys Glu Glu
65 70 75 80

Ile Gly Thr Ile Leu Ala Lys Glu Val Ala Lys Gly Ile Lys Ala Ala
85 90 95

Ile Gly Glu Val Val Arg Thr Ala Asp Leu Ile Arg Tyr Ala Ala Glu
100 105 110

Glu Gly Leu Arg Ile Thr Gly Gln Ala Met Glu Gly Gly Gly Phe Glu
 115 120 125

Ala Thr Ser Lys Asn Lys Leu Ala Val Val Arg Arg Glu Pro Val Gly
 130 135 140

Ile Val Leu Ala Ile Ala Pro Phe Asn Tyr Pro Val Asn Leu Ser Ala
 145 150 155 160

Ser Lys Ile Ala Pro Ala Leu Ile Ala Gly Asn Val Val Met Phe Lys
 165 170 175

Pro Pro Thr Gln Gly Ser Ile Ser Gly Leu Leu Leu Ala Lys Ala Phe
 180 185 190

Glu Glu Ala Gly Ile Pro Ala Gly Val Phe Asn Thr Ile Thr Gly Arg
 195 200 205

Gly Ser Glu Ile Gly Asp Tyr Ile Ile Glu His Lys Glu Val Asn Phe
 210 215 220

Ile Asn Phe Thr Gly Ser Thr Pro Ile Gly Glu Arg Ile Gly Arg Leu
 225 230 235 240

Ala Gly Met Arg Pro Ile Met Leu Glu Leu Gly Gly Lys Asp Ala Ala
 245 250 255

Leu Val Leu Glu Asp Ala Asp Leu Glu His Ala Ala Lys Gln Ile Val
 260 265 270

Ala Gly Ala Phe Ser Tyr Ser Gly Gln Arg Cys Thr Ala Ile Lys Arg
 275 280 285

Val Ile Val Leu Glu Ser Val Ala Asp Lys Leu Ala Thr Leu Leu Gln
 290 295 300

Glu Glu Val Ser Lys Leu Thr Val Gly Asp Pro Phe Asp Asn Ala Asp
 305 310 315 320

Ile Thr Pro Val Ile Asp Asn Ala Ser Ala Asp Phe Ile Trp Gly Leu
 325 330 335

Ile Glu Asp Ala Gln Glu Lys Glu Ala Gln Ala Leu Thr Pro Ile Lys
 340 345 350

Arg Glu Gly Asn Leu Leu Trp Pro Val Leu Phe Asp Gln Val Thr Lys
 355 360 365

Asp Met Lys Val Ala Trp Glu Glu Pro Phe Gly Pro Val Leu Pro Ile
 370 375 380

Ile Arg Val Ala Ser Val Glu Glu Ala Ile Ala Phe Ala Asn Glu Ser
 385 390 395 400

Glu Phe Gly Leu Gln Ser Ser Val Phe Thr Asn Asp Phe Lys Lys Ala
 405 410 415

Phe Glu Ile Ala Glu Lys Leu Glu Val Gly Thr Val His Ile Asn Asn
 420 425 430

Lys Thr Gln Arg Gly Pro Asp Asn Phe Pro Phe Leu Gly Val Lys Gly
 435 440 445

Ser Gly Ala Gly Val Gln Gly Ile Lys Tyr Ser Ile Glu Ala Met Thr
 450 455 460

Asn Val Lys Ser Ile Val Phe Asp Val Lys
 465 470

<210> 668

<211> 326

<212> PRT

<213> Streptococcus pneumoniae

<400> 668

Met Ala Leu Thr Glu Gln Lys Arg Val Arg Leu Glu Lys Leu Ser Asp
 1 5 10 15

Glu Asn Gly Ile Ile Ser Ala Leu Ala Phe Asp Gln Arg Gly Ala Leu
 20 25 30

Lys Arg Leu Met Val Lys His Gln Thr Glu Glu Pro Thr Val Ala Gln
 35 40 45

Met Glu Glu Leu Lys Val Leu Val Ala Asp Glu Leu Thr Lys Tyr Ala
 50 55 60

Ser Ser Met Leu Leu Asp Pro Glu Tyr Gly Leu Pro Ala Thr Lys Ala
 65 70 75 80

Leu Asp Glu Lys Ala Gly Leu Leu Leu Ala Tyr Glu Lys Thr Gly Tyr
 85 90 95

Asp Thr Thr Ser Thr Lys Arg Leu Pro Asp Cys Leu Asp Val Trp Ser
 100 105 110

Ala Lys Arg Ile Lys Glu Glu Gly Ala Asp Ala Val Lys Phe Leu Leu
 115 120 125

Tyr Tyr Asp Val Asp Ser Ser Asp Glu Leu Asn Gln Glu Lys Gln Ala
 130 135 140

Tyr Ile Glu Arg Ile Gly Ser Glu Cys Val Ala Glu Asp Ile Pro Phe
 145 150 155 160

Phe Leu Glu Ile Leu Ala Tyr Asp Glu Lys Ile Ala Asp Ala Gly Ser
 165 170 175

Val Glu Tyr Ala Lys Val Lys Pro His Lys Val Ile Gly Ala Met Lys
 180 185 190

Val Phe Ser Asp Pro Arg Phe Asn Ile Asp Val Leu Lys Val Glu Val
 195 200 205

Pro Val Asn Ile Lys Tyr Val Glu Gly Phe Ala Glu Gly Glu Val Val
 210 215 220

Tyr Thr Arg Glu Glu Ala Ala Ala Phe Phe Lys Ala Gln Asp Glu Ala
 225 230 235 240

Thr Asn Leu Pro Tyr Ile Tyr Leu Ser Ala Gly Val Ser Ala Lys Leu
 245 250 255

Phe Gln Asp Thr Leu Val Phe Ala His Glu Ser Gly Ala Asn Phe Asn

260 265 270

Gly Val Leu Cys Gly Arg Ala Thr Trp Ala Gly Ser Val Glu Ala Tyr
275 280 285

Ile Lys Asp Gly Glu Ala Ala Arg Glu Cys Val Arg Thr Thr Gly
290 295 300

Phe Glu Asn Ile Asp Glu Leu Asn Lys Val Leu Gln Arg Thr Ala Thr
305 310 315 320

Ser Trp Lys Glu Arg Val
325

<210> 669
<211> 171
<212> FRT
<213> Streptococcus pneumoniae

<400> 669

Met Arg Ile Ala Ile Gly Cys Asp His Ile Val Thr Asp Glu Lys Met
1 5 10 15

Ala Val Ser Glu Phe Leu Lys Ser Lys Gly Tyr Glu Val Ile Asp Phe
20 25 30

Gly Thr Tyr Asp His Thr Arg Thr His Tyr Pro Ile Phe Gly Lys Lys
35 40 45

Val Gly Glu Ala Val Thr Ser Gly Gln Ala Asp Leu Gly Val Cys Ile
50 55 60

Cys Gly Thr Gly Val Gly Ile Asn Asn Ala Val Asn Lys Val Pro Gly
65 70 75 80

Val Arg Ser Ala Leu Val Arg Asp Met Thr Thr Ala Leu Tyr Ala Lys
85 90 95

Glu Gln Leu Asn Ala Asn Val Ile Gly Phe Gly Gly Lys Ile Thr Gly
100 105 110

Glu Leu Leu Met Cys Asp Ile Ile Glu Ala Phe Ile His Ala Glu Tyr

115 120 125
 Lys Pro Thr Glu Glu Asn Lys Lys Leu Ile Ala Lys Ile Glu His Val
 130 135 140
 Glu Ser His Asn Ala Gln Gln Thr Asp Ala Asn Phe Phe Thr Glu Phe
 145 150 155 160
 Leu Glu Lys Trp Asp Arg Gly Glu Tyr His Asp
 165 170
 <210> 670
 <211> 141
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 670
 Met Ser Ile Val Ile Gly Ala Asp Ala Ala Gly Leu Arg Leu Lys Glu
 1 5 10 15
 Val Val Lys Asp Phe Leu Glu Lys Glu Asn Phe His Leu Val Asp Val
 20 25 30
 Thr Ala Glu Gly Gln Asp Phe Val Asp Val Thr Leu Ala Val Ala Ala
 35 40 45
 Glu Val Asn Lys Glu Glu Gln Asn Leu Gly Ile Val Ile Asp Ala Tyr
 50 55 60
 Gly Ala Gly Pro Phe Ile Val Ala Thr Lys Ile Lys Gly Met Val Ala
 65 70 75 80
 Ala Glu Val Ser Asp Glu Arg Ser Ala Tyr Met Thr Arg Gly His Asn
 85 90 95
 Asn Ser Arg Met Ile Thr Met Gly Ala Gln Leu Val Gly Asp Glu Leu
 100 105 110
 Ala Lys Asn Ile Ala Lys Gly Phe Val Asn Gly Lys Tyr Asp Gly Gly
 115 120 125
 Arg His Gln Ile Arg Val Asp Met Leu Asn Lys Met Gly

130 135 140

<210> 671
 <211> 628
 <212> PRT
 <213> *Streptococcus pneumoniae*

<400> 671

Met Val Leu Ser Lys Tyr Gln Lys Gln Phe Ile Ile Asn Arg Tyr Pro
 1 5 10 15

Glu Arg Lys Arg Ile Met Asn Leu Glu Glu Leu Lys Lys Arg Gln Glu
 20 25 30

Lys Ile Arg Asn Phe Ser Ile Ile Ala His Ile Asp His Gly Lys Ser
 35 40 45

Thr Leu Ala Asp Arg Ile Leu Glu Lys Thr Glu Thr Val Ser Ser Arg
 50 55 60

Glu Met Gln Ala Gln Leu Leu Asp Ser Met Glu Leu Glu Arg Glu Arg
 65 70 75 80

Gly Ile Thr Ile Lys Leu Asn Ala Ile Glu Leu Asn Tyr Thr Ala Lys
 85 90 95

Asp Gly Glu Thr Tyr Ile Phe His Leu Ile Asp Thr Pro Gly His Val
 100 105 110

Asp Phe Thr Tyr Glu Val Ser Arg Ser Leu Ala Ala Cys Glu Gly Ala
 115 120 125

Ile Leu Val Val Asp Ala Ala Gln Gly Ile Glu Ala Gln Thr Leu Ala
 130 135 140

Asn Val Tyr Leu Ala Leu Asp Asn Asp Leu Glu Ile Met Pro Ile Ile
 145 150 155 160

Asn Lys Ile Asp Leu Pro Ala Ala Asp Pro Glu Arg Val Arg Thr Glu
 165 170 175

Ile Glu Asp Val Ile Gly Leu Asp Ala Ser Glu Ala Val Leu Ala Ser

180	185	190
Ala Lys Ala Gly Ile Gly Ile Glu Glu Ile Leu Glu Gln Ile Val Glu 195 200 205		
Lys Val Pro Ala Pro Thr Gly Asp Val Thr Ala Pro Leu Lys Ala Leu 210 215 220		
Ile Phe Asp Ser Val Tyr Asp Ala Tyr Arg Gly Val Ile Leu Gln Val 225 230 235 240		
Arg Val Met Asp Gly Val Val Lys Pro Gly Asp Lys Ile Gln Leu Met 245 250 255		
Ser Asn Ser Lys Thr Phe Asp Val Ala Glu Val Gly Ile Phe Thr Pro 260 265 270		
Lys Ala Val Gly Arg Asp Phe Leu Ala Thr Gly Asp Val Gly Tyr Ile 275 280 285		
Ala Ala Ser Ile Lys Thr Val Gln Asp Thr Arg Val Gly Asp Thr Val 290 295 300		
Thr Leu Ala Thr Asn Pro Ala Ala Glu Pro Leu His Gly Tyr Lys Gln 305 310 315 320		
Met Asn Pro Met Val Phe Ala Gly Leu Tyr Pro Ile Glu Ser Asn Lys 325 330 335		
Tyr Asn Asp Leu Arg Glu Ala Leu Glu Lys Leu Gln Leu Asn Asp Ala 340 345 350		
Ser Leu Gln Phe Glu Pro Glu Thr Ser Gln Ala Leu Gly Phe Gly Phe 355 360 365		
Arg Cys Gly Phe Leu Gly Leu Leu His Met Asp Val Ile Gln Glu Arg 370 375 380		
Leu Glu Arg Glu Phe Asn Ile Asp Leu Ile Met Thr Ala Pro Ser Val 385 390 395 400		

Ile Tyr Lys Val Asn Leu Thr Asp Gly Glu Ser Met Asp Val Ser Asn
405 410 415

Pro Ser Glu Phe Pro Asp Pro Thr Lys Ile Ala Thr Ile Glu Glu Pro
420 425 430

Tyr Val Lys Ala Gln Ile Met Val Pro Gln Glu Phe Val Gly Ala Val
435 440 445

Met Glu Leu Ala Gln Arg Lys Arg Gly Asp Phe Val Thr Met Asp Tyr
450 455 460

Ile Asp Asp Asn Arg Val Asn Val Ile Tyr Gln Ile Pro Leu Ala Glu
465 470 475 480

Ile Val Phe Asp Phe Phe Asp Lys Leu Lys Ser Ser Thr Arg Gly Tyr
485 490 495

Ala Ser Phe Asp Tyr Glu Leu Ser Glu Tyr Arg Pro Ser Lys Leu Val
500 505 510

Lys Met Asp Ile Leu Leu Asn Gly Asp Lys Val Asp Ala Leu Ser Phe
515 520 525

Ile Val His Lys Asp Phe Ala Tyr Glu Arg Gly Lys Leu Ile Val Asp
530 535 540

Lys Leu Lys Lys Ile Ile Pro Arg Gln Gln Phe Glu Val Pro Ile Gln
545 550 555 560

Ala Ala Ile Gly His Lys Ile Val Ala Arg Thr Asp Ile Lys Ala Leu
565 570 575

Arg Lys Asn Val Leu Ala Lys Cys Tyr Gly Gly Asp Val Ser Arg Lys
580 585 590

Arg Lys Leu Leu Glu Lys Gln Lys Ala Gly Lys Lys Arg Met Lys Ser
595 600 605

Ile Gly Ser Val Glu Val Pro Gln Glu Ala Phe Leu Ser Val Leu Ser
610 615 620

Met Asp Glu Glu
625

<210> 672
<211> 448
<212> PPT
<213> Streptococcus pneumoniae

<400> 672

Met Glu Met Glu Lys Tyr Leu Ser Val Thr Thr Leu Thr Lys Tyr Leu
1 5 10 15

Lys Met Lys Phe Asp Lys Asp Pro Tyr Leu Glu Arg Val Tyr Leu Thr
20 25 30

Gly Gln Val Ser Asn Phe Arg Lys Arg Pro Thr His Gln Tyr Phe Ser
35 40 45

Leu Lys Asp Asp His Ala Val Ile Gln Ala Thr Ile Trp Ser Gly Ile
50 55 60

Tyr Gln Lys Leu Gly Phe Asp Leu Glu Glu Gly Met Lys Ile Asn Val
65 70 75 80

Ile Gly Arg Val Gln Val Tyr Glu Pro Ser Gly Ser Tyr Ser Ile Ile
85 90 95

Ile Glu Lys Ala Glu Pro Asp Gly Val Gly Ala Leu Ala Ile Gln Phe
100 105 110

Glu Gln Leu Lys Lys Lys Leu Thr Glu Glu Gly Leu Phe Gln Glu Arg
115 120 125

Phe Lys Gln Ala Leu Pro Gln Phe Ser Lys Arg Ile Gly Val Val Thr
130 135 140

Ser Arg Ser Gly Ala Val Ile Arg Asp Ile Ile Thr Thr Val Ser Arg
145 150 155 160

Arg Phe Pro Gly Val Asp Ile Leu Leu Tyr Pro Thr Lys Val Gln Gly
165 170 175

Glu Gly Ala Ala Glu Glu Ile Ala Arg Asn Ile Ala Arg Ala Asn Gln
 180 185 190

Arg Asp Asp Leu Asp Leu Leu Ile Ile Gly Arg Gly Gly Gly Ser Ile
 195 200 205

Glu Asp Leu Trp Ala Phe Asn Glu Glu Ile Val Val Arg Ala Ile Phe
 210 215 220

Glu Ser Arg Leu Pro Val Ile Ser Ser Val Gly His Glu Thr Asp Val
 225 230 235 240

Thr Leu Ala Asp Phe Val Ala Asp Arg Arg Ala Ala Thr Pro Thr Ala
 245 250 255

Ala Ala Glu Leu Ala Thr Pro Val Thr Lys Leu Asp Val Leu Ala His
 260 265 270

Leu Gln Asn Gln Glu Lys Arg Met Val Thr Ala Val Arg Asn Val Leu
 275 280 285

Ser Lys Lys Gln Glu Ala Leu Lys Lys Cys Ser Gln Ser Val Ile Phe
 290 295 300

Arg Gln Pro Glu Arg Leu Tyr Asp Gly Tyr Leu Gln Arg Leu Asp Gln
 305 310 315 320

Leu Gln Leu Arg Leu Lys Gln Ser Leu Arg Thr Arg Ile Ser Asp Asn
 325 330 335

Lys Gln Leu Val Gln Ala Arg Thr His Gln Leu Val Gln Leu Ser Pro
 340 345 350

Val Thr Lys Ile Gln Arg Tyr Gln Asp Arg Leu Gly Gln Leu Asp Lys
 355 360 365

Leu Leu Gly Ser Gln Met Ala Leu Val Tyr Asp Ala Lys Val Ala Glu
 370 375 380

Ala Lys Arg Leu Ser Glu Ala Leu Leu Met Leu Asp Thr Ser Arg Ile
 385 390 395 400

Val Ala Arg Gly Tyr Ala Ile Val Lys Lys Glu Glu Ser Val Val Asp
 405 410 415

Ser Val Glu Ser Leu Lys Lys Lys Asp Gln Val Thr Leu Leu Met Arg
 420 425 430

Asp Gly Gln Val Glu Leu Glu Val Lys Asp Val Lys Thr Lys Glu Ile
 435 440 445

<210> 673

<211> 247

<212> PRT

<213> Streptococcus pneumoniae

<400> 673

Met Ser Gln Lys Asn Asn Lys Lys Lys Asn Lys Arg Lys Asn Leu Leu
 1 5 10 15

Thr Asn Ile Leu Ala Gly Phe Leu Ile Leu Leu Ser Leu Ala Leu Ile
 20 25 30

Phe Asn Thr Gln Ile Arg Asn Ile Phe Ile Val Trp Asn Thr Asn Lys
 35 40 45

Tyr Gln Val Ser Gln Val Ser Lys Glu Lys Leu Glu Glu Asn Gln Asp
 50 55 60

Thr Glu Gly Asn Phe Asp Phe Asp Ser Val Lys Ala Ile Ser Ser Glu
 65 70 75 80

Ala Val Leu Thr Ser Gln Trp Asp Ala Gln Lys Leu Pro Val Ile Gly
 85 90 95

Gly Ile Ala Ile Pro Glu Leu Glu Met Asn Leu Pro Ile Phe Lys Gly
 100 105 110

Leu Asp Asn Val Asn Leu Phe Tyr Gly Ala Gly Thr Met Lys Arg Glu
 115 120 125

Gln Val Met Gly Glu Gly Asn Tyr Ser Leu Ala Ser His His Ile Phe
 130 135 140

Gly Val Asp Asn Ala Asn Lys Met Leu Phe Ser Pro Leu Asp Asn Ala
 145 150 155 160

Lys Asn Gly Met Lys Ile Tyr Leu Thr Asp Lys Asn Lys Val Tyr Thr
 165 170 175

Tyr Glu Ile Arg Glu Val Lys Arg Val Thr Pro Asp Arg Val Asp Glu
 180 185 190

Val Asp Asp Arg Asp Gly Val Asn Glu Ile Thr Leu Val Thr Cys Glu
 195 200 205

Asp Leu Ala Ala Thr Glu Arg Ile Ile Val Lys Gly Asp Leu Lys Glu
 210 215 220

Thr Lys Asp Tyr Ser Gln Thr Ser Asn Glu Ile Leu Thr Ala Phe Asn
 225 230 235 240

Gln Pro Tyr Lys Gln Phe Tyr
 245

<210> 674

<211> 332

<212> PRT

<213> Streptococcus pneumoniae

<400> 674

Met Phe Lys Thr Met Thr Ser Thr Lys Gln His Lys Lys Val Ile Leu
 1 5 10 15

Val Gly Asp Gly Ala Val Gly Ser Ser Tyr Ala Phe Ala Leu Val Asn
 20 25 30

Gln Gly Ile Ala Gln Glu Leu Gly Ile Ile Glu Ile Pro Gln Leu His
 35 40 45

Glu Lys Ala Val Gly Asp Ala Leu Asp Leu Ser His Ala Leu Ala Phe
 50 55 60

Thr Ser Pro Lys Lys Ile Tyr Ala Ala Gln Tyr Ser Asp Cys Ala Asp
 65 70 75 80

Ala Asp Leu Val Val Ile Thr Ala Gly Ala Pro Gln Lys Pro Gly Glu
85 90 95

Thr Arg Leu Asp Leu Val Gly Lys Asn Leu Ala Ile Asn Lys Ser Ile
100 105 110

Val Thr Gln Val Val Glu Ser Gly Phe Lys Gly Ile Phe Leu Val Ala
115 120 125

Ala Asn Pro Val Asp Val Leu Thr Tyr Ser Thr Trp Lys Phe Ser Gly
130 135 140

Phe Pro Lys Glu Arg Val Ile Gly Ser Gly Thr Ser Leu Asp Ser Ala
145 150 155 160

Arg Phe Arg Gln Ala Leu Ala Glu Lys Leu Asp Val Asp Ala Arg Ser
165 170 175

Val His Ala Tyr Ile Met Gly Glu His Gly Asp Ser Glu Phe Ala Val
180 185 190

Trp Ser His Ala Asn Ile Ala Gly Val Asn Leu Glu Glu Phe Leu Lys
195 200 205

Asp Thr Gln Asn Val Gln Glu Ala Glu Leu Ile Glu Leu Phe Glu Gly
210 215 220

Val Arg Asp Ala Ala Tyr Thr Ile Ile Asn Lys Lys Gly Ala Thr Tyr
225 230 235 240

Tyr Gly Ile Ala Val Ala Leu Ala Arg Ile Thr Lys Ala Ile Leu Asp
245 250 255

Asp Glu Asn Ala Val Leu Pro Leu Ser Val Phe Gln Glu Gly Gln Tyr
260 265 270

Gly Val Glu Asn Val Phe Ile Gly Gln Pro Ala Val Val Gly Ala His
275 280 285

Gly Ile Val Arg Pro Val Asn Ile Pro Leu Asn Asp Ala Glu Thr Gln

290 295 300

Lys Met Gln Ala Ser Ala Lys Glu Leu Gln Ala Ile Ile Asp Glu Ala
305 310 315 320

Trp Lys Asn Pro Glu Phe Gln Glu Ala Ser Lys Asn
 325 330

<210> 675
<211> 183
<212> PRT
<213> Streptococcus pneumoniae

<400> 675

Met Ala Asn Ile Leu Leu Ala Val Thr Gly Ser Ile Ala Ser Tyr Lys
1 5 10 15

Ser Ala Asp Leu Val Ser Ser Leu Lys Lys Gln Gly His Gln Val Thr
 20 25 30

Val Leu Met Thr Gln Ala Ala Thr Glu Phe Ile Gln Pro Leu Thr Leu
 35 40 45

Gln Val Leu Ser Gln Asn Pro Val His Leu Asp Val Met Lys Glu Pro
50 55 60

Tyr Pro Asp Gln Val Asn His Ile Glu Leu Gly Lys Lys Ala Asp Leu
65 70 75 80

Phe Ile Val Val Pro Ala Thr Ala Asn Thr Ile Ala Lys Leu Ala His
 85 90 95

Gly Phe Ala Asp Asn Met Val Thr Ser Thr Ala Leu Ala Leu Pro Ser
 100 105 110

His Ile Pro Lys Leu Ile Ala Pro Ala Met Asn Thr Lys Met Tyr Asp
115 120 125

His Pro Val Thr Gln Asn Asn Leu Lys Thr Leu Glu Thr Tyr Gly Tyr
130 135 140

Gln Leu Ile Ala Pro Lys Glu Ser Leu Leu Ala Cys Gly Asp His Glu

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145              150              155              160
Arg Gly Ala Leu Ala Asp Leu Thr Ile Ile Leu Glu Arg Ile Lys Glu
              165              170              175

Thr Ile Asp Glu Lys Thr Leu
              180

<210>  676
<211>  289
<212>  PRT
<213>  Streptococcus pneumoniae

<400>  676

Met Glu Lys Ile Ile Lys Glu Lys Ile Ser Ser Leu Leu Ser Gln Glu
1              5              10              15

Glu Glu Val Leu Ser Val Glu Gln Leu Gly Gly Met Thr Asn Gln Asn
              20              25              30

Tyr Leu Ala Lys Thr Thr Asn Lys Gln Tyr Ile Val Lys Phe Phe Gly
              35              40              45

Lys Gly Thr Glu Lys Leu Ile Asn Arg Gln Asp Glu Lys Tyr Asn Leu
50              55              60

Glu Leu Leu Lys Asp Leu Gly Leu Asp Val Lys Asn Tyr Leu Phe Asp
65              70              75              80

Ile Glu Ala Gly Ile Lys Val Asn Glu Tyr Ile Glu Ser Ala Ile Thr
              85              90              95

Leu Asp Ser Thr Ser Ile Lys Thr Lys Phe Asp Lys Ile Thr Pro Ile
              100              105              110

Leu Gln Thr Ile His Thr Ser Ala Lys Glu Leu Arg Gly Glu Phe Ala
              115              120              125

Pro Phe Glu Glu Ile Lys Lys Tyr Glu Ser Leu Ile Glu Glu Gln Ile
              130              135              140

Pro Tyr Ala Asn Tyr Glu Ser Val Arg Asn Ala Val Phe Ser Leu Glu

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145 150 155 160
 Lys Arg Leu Ala Asp Leu Gly Val Asp Arg Lys Ser Cys His Ile Asp
 165 170 175
 Leu Val Pro Glu Asn Phe Ile Glu Ser Pro Gln Gly Arg Leu Tyr Leu
 180 185 190
 Ile Asp Trp Glu Tyr Ser Ser Met Asn Asp Pro Met Trp Asp Leu Ala
 195 200 205
 Ala Leu Phe Leu Glu Ser Glu Phe Thr Ser Gln Glu Glu Glu Thr Phe
 210 215 220
 Leu Ser His Tyr Glu Ser Asp Gln Thr Pro Val Ser His Glu Lys Ile
 225 230 235 240
 Ala Ile Tyr Lys Ile Leu Gln Asp Thr Ile Trp Ser Leu Trp Thr Val
 245 250 255
 Tyr Lys Glu Glu Gln Gly Glu Asp Phe Gly Asp Tyr Gly Val Asn Arg
 260 265 270
 Tyr Gln Arg Ala Ile Lys Gly Leu Ala Ser Tyr Gly Gly Ser Asp Glu
 275 280 285

 Lys

 <210> 677
 <211> 267
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 677
 Met Lys Gln Leu Thr Val Glu Asp Ala Lys Gln Ile Glu Leu Glu Ile
 1 5 10 15

 Leu Asp Tyr Ile Asp Thr Leu Cys Lys Lys His Asn Ile Asn Tyr Ile
 20 25 30

 Ile Asn Tyr Gly Thr Leu Ile Gly Ala Val Arg His Glu Gly Phe Ile

35										40										45																			
Pro	Trp	Asp	Asp	Asp	Ile	Asp	Leu	Ser	Met	Pro	Arg	Glu	Asp	Tyr	Gln																								
50										55										60																			
Arg	Phe	Ile	Asn	Ile	Phe	Gln	Lys	Glu	Lys	Ser	Lys	Tyr	Lys	Leu	Leu																								
65										70										75										80									
Ser	Leu	Glu	Thr	Asp	Lys	Asn	Tyr	Phe	Asn	Asn	Phe	Ile	Lys	Ile	Thr																								
										85										90										95									
Asp	Ser	Thr	Thr	Lys	Ile	Ile	Asp	Thr	Arg	Asn	Thr	Lys	Thr	Tyr	Glu																								
										100										105										110									
Ser	Gly	Ile	Phe	Ile	Asp	Ile	Phe	Pro	Ile	Asp	Arg	Phe	Asp	Asp	Pro																								
115										120										125																			
Lys	Val	Ile	Asp	Thr	Cys	Tyr	Lys	Leu	Glu	Ser	Phe	Lys	Leu	Leu	Ser																								
										130										135										140									
Phe	Ser	Lys	His	Lys	Asn	Ile	Val	Tyr	Lys	Asp	Ser	Leu	Leu	Lys	Asp																								
145										150										155										160									
Trp	Ile	Arg	Thr	Ala	Phe	Trp	Leu	Leu	Leu	Arg	Pro	Val	Ser	Pro	Arg																								
										165										170										175									
Tyr	Phe	Ala	Asn	Lys	Ile	Glu	Lys	Glu	Ile	Gln	Lys	Tyr	Ser	Arg	Glu																								
										180										185										190									
Asn	Gly	Gln	Tyr	Met	Ala	Phe	Ile	Pro	Ser	Lys	Phe	Lys	Glu	Lys	Glu																								
195										200										205																			
Val	Phe	Pro	Ser	Gly	Thr	Phe	Asp	Lys	Thr	Ile	Asp	Leu	Pro	Phe	Glu																								
210										215										220																			
Asn	Leu	Ser	Leu	Pro	Ala	Pro	Glu	Lys	Phe	Asp	Thr	Ile	Leu	Thr	Gln																								
225										230										235										240									
Phe	Tyr	Gly	Asp	Tyr	Met	Thr	Leu	Pro	Pro	Glu	Glu	Lys	Arg	Phe	Tyr																								
										245										250										255									

Ser His Glu Phe His Ala Tyr Lys Leu Glu Asp
 260 265

<210> 678

<211> 115

<212> PRT

<213> Streptococcus pneumoniae

<400> 678

Met Asn Pro Leu Ile Gln Ser Leu Thr Glu Gly Gln Leu Arg Thr Asp
 1 5 10 15

Ile Pro Ser Phe Arg Pro Gly Asp Thr Val Arg Val His Ala Lys Val
 20 25 30

Val Glu Gly Asn Arg Glu Arg Ile Gln Ile Phe Glu Gly Val Val Ile
 35 40 45

Ala Arg Lys Gly Ala Gly Ile Ser Glu Asn Tyr Thr Val Arg Lys Ile
 50 55 60

Ser Asn Gly Val Gly Val Glu Arg Ile Phe Pro Ile His Thr Pro Arg
 65 70 75 80

Val Glu Lys Ile Glu Val Val Arg Tyr Gly Lys Val Arg Arg Ala Lys
 85 90 95

Leu Tyr Tyr Leu Arg Ala Leu Gln Gly Lys Ala Ala Arg Ile Lys Glu
 100 105 110

Ile Arg Arg
 115

<210> 679

<211> 147

<212> PRT

<213> Streptococcus pneumoniae

<400> 679

Met Ala Leu Ala Lys Ile Val Phe Ala Ser Met Thr Gly Asn Thr Glu
 1 5 10 15

Glu Ile Ala Asp Ile Val Ala Asp Lys Leu Arg Asp Leu Gly Leu Asp

20										25										30																																	
Val	Asp	Val	Asp	Glu	Cys	Thr	Thr	Val	Asp	Ala	Ser	Asp	Phe	Leu	Glu																																						
		35						40					45																																								
Ala	Asp	Ile	Ala	Ile	Val	Ala	Thr	Tyr	Thr	Tyr	Gly	Asp	Gly	Glu	Leu																																						
		50					55					60																																									
Pro	Asp	Glu	Met	Met	Asp	Phe	Tyr	Glu	Asp	Leu	Ala	Asp	Leu	Asn	Leu																																						
		65			70					75				80																																							
Asn	Gly	Lys	Ile	Tyr	Gly	Val	Val	Gly	Ser	Gly	Asp	Thr	Phe	Tyr	Asp																																						
				85					90				95																																								
Glu	Phe	Cys	Lys	Ala	Val	Asp	Asp	Phe	Asp	Arg	Val	Phe	Val	Ser	Thr																																						
			100					105				110																																									
Gly	Ala	Glu	Lys	Gly	Ser	Glu	Cys	Val	Lys	Val	Asp	Leu	Ser	Ala	Glu																																						
		115					120					125																																									
Glu	Glu	Asp	Ile	Glu	Arg	Leu	Glu	Gln	Phe	Ala	Glu	Glu	Leu	Ala	Ala																																						
		130				135						140																																									
Lys	Val	Gly																																																			
		145																																																			
<210>	680																																																				
<211>	127																																																				
<212>	PRT																																																				
<213>	Streptococcus pneumoniae																																																				
<400>	680																																																				
Met	Glu	Glu	Ile	Thr	Met	Ala	Leu	Asn	Ile	Glu	Asn	Ile	Ile	Ala	Glu																																						
		1			5				10				15																																								
Ile	Lys	Glu	Ala	Ser	Ile	Leu	Glu	Leu	Asn	Asp	Leu	Val	Lys	Ala	Ile																																						
			20					25				30																																									
Glu	Glu	Glu	Phe	Gly	Val	Thr	Ala	Ala	Ala	Pro	Val	Ala	Val	Ala	Ala																																						
		35					40					45																																									
Ala	Asp	Ala	Ala	Asp	Ala	Gly	Ala	Ala	Lys	Asp	Ser	Phe	Asp	Val	Glu																																						

50 55 60
 Leu Thr Ser Ala Gly Asp Lys Lys Val Gly Val Ile Lys Val Val Arg
 65 70 75 80
 Glu Ile Thr Gly Leu Gly Leu Lys Glu Ala Lys Glu Leu Val Asp Gly
 85 90 95
 Ala Pro Ala Leu Val Lys Glu Gly Val Ala Thr Ala Glu Ala Glu Glu
 100 105 110
 Ile Lys Ala Lys Leu Glu Glu Ala Gly Ala Ser Val Thr Leu Lys
 115 120 125
 <210> 681
 <211> 170
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 681
 Met Asn Thr Leu Met Ser Glu Ala Ile Ile Ala Lys Lys Ala Glu Leu
 1 5 10 15
 Val Asp Val Val Ala Glu Lys Met Lys Ala Ala Ala Ser Ile Val Val
 20 25 30
 Val Asp Ala Arg Gly Leu Thr Val Glu Gln Asp Thr Val Leu Arg Arg
 35 40 45
 Glu Leu Arg Gly Ser Glu Val Glu Tyr Lys Val Ile Lys Asn Ser Ile
 50 55 60
 Leu Arg Arg Ala Ala Glu Lys Ala Gly Leu Glu Asp Leu Ala Ser Val
 65 70 75 80
 Phe Val Gly Pro Ser Ala Val Ala Phe Ser Asn Glu Asp Val Ile Ala
 85 90 95
 Pro Ala Lys Ile Leu Asn Asp Phe Ser Lys Asn Ala Glu Ala Leu Glu
 100 105 110
 Ile Lys Gly Gly Ala Ile Glu Gly Ala Val Ala Ser Lys Glu Glu Ile

115 120 125
 Leu Ala Leu Ala Thr Leu Pro Asn Arg Glu Gly Leu Leu Ser Met Leu
 130 135 140
 Leu Ser Val Leu Gln Ala Pro Val Arg Asn Val Ala Leu Ala Val Lys
 145 150 155 160
 Ala Val Ala Glu Ser Lys Glu Asp Ala Ala
 165 170
 <210> 682
 <211> 596
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 682
 Met Lys Ser Met His Pro Asn Met Glu Arg Thr Arg Met Lys Arg
 1 5 10 15
 Gln Thr Val Asn Gln Thr Leu Lys Arg Leu Ala Val Asp Leu Ala Ser
 20 25 30
 His Pro Phe Leu Leu Phe Leu Ala Phe Leu Gly Thr Ile Ala Gln Val
 35 40 45
 Gly Leu Ser Ile Tyr Leu Pro Ile Leu Ile Gly Gln Val Ile Asp Gln
 50 55 60
 Val Leu Val Ala Gly Ser Ser Pro Val Phe Trp Gln Ile Phe Leu Gln
 65 70 75 80
 Met Leu Leu Val Val Ile Gly Asn Thr Leu Val Gln Trp Ala Asn Pro
 85 90 95
 Leu Leu Tyr Asn Arg Leu Ile Phe Ser Tyr Thr Arg Asp Leu Arg Glu
 100 105 110
 Arg Ile Ile His Lys Leu His Arg Leu Pro Ile Ala Phe Val Asp Arg
 115 120 125
 Gln Gly Ser Gly Glu Met Val Ser Arg Val Thr Thr Asp Ile Glu Gln

130	135	140
Leu Ala Ala Gly Leu Thr Met Ile Phe Asn Gln Phe Phe Ile Gly Val 145	150	155
Leu Met Ile Leu Val Ser Ile Leu Ala Met Leu Gln Ile His Leu Leu 165	170	175
Met Thr Leu Leu Val Leu Leu Leu Thr Pro Leu Ser Met Val Ile Ser 180	185	190
Arg Phe Ile Ala Lys Lys Ser Tyr His Leu Phe Gln Lys Gln Thr Glu 195	200	205
Thr Arg Gly Ile Gln Thr Gln Leu Ile Glu Glu Ser Leu Ser Gln Gln 210	215	220
Thr Ile Ile Gln Ser Phe Asn Ala Gln Thr Glu Phe Ile Gln Arg Leu 225	230	235
Arg Glu Ala His Asp Asn Tyr Ser Gly Tyr Ser Gln Ser Ala Ile Phe 245	250	255
Tyr Ser Ser Thr Val Asn Pro Ser Thr Arg Phe Val Asn Ala Leu Ile 260	265	270
Tyr Ala Leu Leu Ala Gly Val Gly Ala Tyr Arg Ile Met Met Gly Ser 275	280	285
Ala Leu Thr Val Gly Arg Leu Val Thr Phe Leu Asn Tyr Val Gln Gln 290	295	300
Tyr Thr Lys Pro Phe Asn Asp Ile Ser Ser Val Leu Ala Glu Leu Gln 305	310	315
Ser Ala Leu Ala Cys Val Glu Arg Ile Tyr Gly Val Leu Asp Ser Pro 325	330	335
Glu Val Ala Glu Thr Gly Lys Glu Val Leu Thr Thr Ser Asp Gln Val 340	345	350

Lys Gly Ala Ile Ser Phe Lys His Val Ser Phe Gly Tyr His Pro Glu
 355 360 365

Lys Ile Leu Ile Lys Asp Leu Ser Ile Asp Ile Pro Ala Gly Ser Lys
 370 375 380

Val Ala Ile Val Gly Pro Thr Gly Ala Gly Lys Ser Thr Leu Ile Asn
 385 390 395 400

Leu Leu Met Arg Phe Tyr Pro Ile Ser Ser Gly Asp Ile Leu Leu Asp
 405 410 415

Gly Gln Ser Ile Tyr Asp Tyr Thr Arg Val Ser Leu Arg Gln Gln Phe
 420 425 430

Gly Met Val Leu Gln Glu Thr Trp Leu Thr Gln Gly Thr Ile His Asp
 435 440 445

Asn Ile Ala Phe Gly Asn Pro Glu Ala Ser Arg Glu Gln Val Ile Ala
 450 455 460

Ala Ala Lys Ala Ala Asn Ala Asp Phe Phe Ile Gln Gln Leu Pro Gln
 465 470 475 480

Gly Tyr Asp Thr Lys Leu Glu Asn Ala Gly Glu Ser Leu Ser Val Gly
 485 490 495

Gln Ala Gln Leu Leu Thr Ile Ala Arg Val Phe Leu Ala Ile Pro Lys
 500 505 510

Ile Leu Ile Leu Asp Glu Ala Thr Ser Ser Ile Asp Thr Arg Thr Glu
 515 520 525

Val Leu Val Gln Asp Ala Phe Ala Lys Leu Met Lys Gly Arg Thr Ser
 530 535 540

Phe Ile Ile Ala His Arg Leu Ser Thr Ile Gln Asp Ala Asp Leu Ile
 545 550 555 560

Leu Val Leu Val Asp Gly Asp Ile Val Glu Tyr Gly Asn His Gln Glu
 565 570 575

Leu Met Asp Arg Lys Gly Lys Tyr Tyr Gln Met Gln Lys Ala Ala Ala
 580 585 590

Phe Ser Ser Glu
 595

<210> 683

<211> 344

<212> PRT

<213> Streptococcus pneumoniae

<400> 683

Met Phe Glu His Tyr Ser Val Ala Asp Leu Phe Ala Asn Leu Tyr Lys
 1 5 10 15

Lys Arg Lys Ala Asn Ile Leu Ala Leu Ile Ala Leu Phe Ala Leu Ile
 20 25 30

Ala Val Pro Phe Thr Ile Lys Ala Val Arg Asn Lys Asn Thr Val Lys
 35 40 45

Asp Thr Thr Ser Tyr Ser Thr Tyr Leu Ile Tyr Lys Ile Thr Pro Pro
 50 55 60

Lys Glu Ser Asp Lys Thr Ile Leu Asn His Gln Ile Gly Gly Tyr Ser
 65 70 75 80

Asp Phe Tyr Gly Lys Leu Ile Asp Gly Asn Leu Asn Gly Ala Tyr Leu
 85 90 95

Phe Asn Asp Val Glu Pro Ser Glu Leu Lys Lys Ile Ala Ser Glu Leu
 100 105 110

Asp Thr Thr Glu Thr Thr Leu Lys Asn Ser Thr Asn Asp Tyr Trp Trp
 115 120 125

Lys Lys Leu Thr Val Tyr Tyr Met Ile Asp Asp Ala Gly Val Gly Val
 130 135 140

Lys Ile Leu Thr Ser Ser Lys Asp Ala Asn Asn Leu Leu Glu Lys Lys
 145 150 155 160

Ile Asp Gly Leu Ile Glu Lys Phe Lys His Ala Tyr Ala Asn Val Lys
 165 170 175

Ile Glu Lys Leu Glu Thr Ile Asn Ser Lys Glu Leu Asn Ala Asn Gly
 180 185 190

Glu Thr Ala Leu Gly Leu Asn Val Lys Asn Leu Ile Leu Arg Leu Val
 195 200 205

Val Ile Gly Val Val Cys Val Ile Leu Val Val Met Gly Asn Val Leu
 210 215 220

Val Tyr Leu Phe Asn Pro Thr Ile Asn Arg Val Gly Asp Phe Ser Gln
 225 230 235 240

Tyr Gln Ile Asp Phe Val Thr Glu Ile Thr Thr Ile Ala Asn Leu Ala
 245 250 255

Asp Val Leu Ser Tyr Lys Asn Thr Gly Gln Glu Leu Thr Ile Val Ser
 260 265 270

Ser Asn Lys Ala Ile Leu Asp Lys Leu Lys Gln Ser Gln Glu Ala Leu
 275 280 285

Lys Gly Met His Phe Val Asp Leu Gln Asp Val Ser Ser Leu Leu Glu
 290 295 300

Arg Asp Thr Val Leu Leu Val Glu Glu Tyr Gly Val Thr Arg Tyr Lys
 305 310 315 320

Lys Phe Glu Gln Ser Leu Gln Ile Leu Arg Asn Leu Asn Arg Ser Ile
 325 330 335

Leu Gly Val Ala Thr Phe Lys Leu
 340

<210> 684

<211> 424

<212> PRT

<213> Streptococcus pneumoniae

<400> 684

Met Ser Lys Glu Asn Pro Leu Ser His His Glu Gln Leu Arg Tyr Asp
 1 5 10 15

Tyr Leu Leu Lys Asn Ile His Tyr Leu Asn Glu Arg Glu Lys Asn Glu
 20 25 30

Phe Ala Tyr Leu Gln Glu Lys Leu Thr Leu Ala Arg Gly Asn Ser Ser
 35 40 45

Ser Ser Leu Glu Gln Glu Arg Glu Glu Gln Val Asp Leu Pro Ser Tyr
 50 55 60

Ala Asn Arg Ser Arg Ser Gln Ser Lys Ser Gln Ala Leu Ser Phe Pro
 65 70 75 80

Pro Lys Lys Lys Arg Arg Lys Leu Arg Leu Lys Arg Ile Phe Met Val
 85 90 95

Ile Phe Ser Leu Leu Val Cys Val Ala Leu Ala Met Val Phe Met Phe
 100 105 110

Leu Arg Gly Tyr Gln Asp Ala Ser Ala Lys Lys Thr Ala Asp Ala Arg
 115 120 125

Ala Ala Gln Val Glu Val Phe Asn Gly Gln Asp Thr Arg Asp Gly Val
 130 135 140

Asn Ile Leu Ile Met Gly Thr Asp Gly Arg Ile Gly Gln Asn Ser Val
 145 150 155 160

Glu Thr Arg Thr Asp Ser Ile Met Val Leu Asn Val Gly Gly Ser Asp
 165 170 175

Lys Lys Met Lys Leu Val Ser Phe Met Arg Asp Asn Leu Val Tyr Ile
 180 185 190

Asp Gly Tyr Ser Gln Val Ile Asn Gly Arg Lys Gln Thr Asp Asn Lys
 195 200 205

Leu Asn Val Ala Tyr Glu Leu Gly Glu Gln Glu Gly Gln Lys Gly Ala
 210 215 220

Glu Met Val Arg Gln Val Leu Lys Asp Asn Phe Asp Leu Asp Ile Lys
 225 230 235 240

Tyr Tyr Ala Leu Val Asp Phe Gln Ala Phe Ala Thr Ala Ile Asp Thr
 245 250 255

Leu Phe Pro Asp Gly Val Thr Ile Asp Ala Gln Phe Ser Thr Leu Asn
 260 265 270

Gly Arg Pro Leu Thr Glu Ala Thr Val Gly Asp Asp Leu Tyr Ala Thr
 275 280 285

Glu Thr Glu Ser Pro Thr Gln Thr Ile Lys Val Gly Lys Gln Gln Met
 290 295 300

Asn Gly Ser Thr Leu Leu Asn Tyr Ala Arg Phe Arg Asp Asp Asp Glu
 305 310 315 320

Ala Asp Tyr Gly Arg Thr Lys Arg Gln Gln Gln Val Leu Thr Ala Ile
 325 330 335

Leu Glu Gln Ile Lys Asp Pro Thr Lys Leu Phe Thr Gly Ser Glu Ala
 340 345 350

Leu Gly Lys Val Phe Ala Met Thr Ser Thr Asn Val Pro Tyr Thr Phe
 355 360 365

Leu Leu Thr Asn Gly Leu Ser Val Leu Asp Gly Ala Lys Asn Gly Ile
 370 375 380

Glu Lys Leu Thr Ile Pro Glu Leu Gly Asp Trp Val Asp Ala Tyr Asp
 385 390 395 400

Val Tyr Gly Gly Leu Gly Leu Leu Val Asp Gln Asn Lys Tyr Gln Thr
 405 410 415

Lys Leu Ala Gln Met Gly Leu Arg
 420

<210> 685


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<211> 267
<212> PRT
<213> Streptococcus pneumoniae

<400> 685

Met Ser Thr Tyr Asn Trp Asp Glu Lys His Ile Leu Thr Phe Pro Glu
1      5      10      15

Glu Lys Val Ala Leu Ser Thr Lys Asp Val His Val Tyr Tyr Gly Lys
      20      25      30

Asn Glu Ser Ile Lys Gly Ile Asp Met Gln Phe Glu Arg Asn Lys Ile
      35      40      45

Thr Ala Leu Ile Gly Pro Ser Gly Ser Gly Lys Ser Thr Tyr Leu Arg
      50      55      60

Ser Leu Asn Arg Met Asn Asp Thr Ile Asp Ile Ala Lys Val Thr Gly
65      70      75      80

Gln Ile Leu Tyr Arg Gly Ile Asp Val Asn Arg Pro Glu Ile Asn Val
      85      90      95

Tyr Glu Met Arg Lys His Ile Gly Met Val Phe Gln Arg Pro Asn Pro
      100      105      110

Phe Ala Lys Ser Ile Tyr Arg Asn Ile Thr Phe Ala His Glu Arg Ala
      115      120      125

Gly Val Lys Asp Lys Gln Val Leu Asp Glu Ile Val Glu Thr Ser Leu
      130      135      140

Arg Gln Ala Ala Leu Trp Asp Gln Val Lys Asp Asp Leu His Lys Ser
145      150      155      160

Ala Leu Thr Leu Ser Gly Gly Gln Gln Gln Arg Leu Cys Ile Ala Arg
      165      170      175

Ala Ile Ser Val Lys Pro Asp Ile Leu Leu Met Asp Glu Pro Ala Ser
      180      185      190

Ala Leu Asp Pro Ile Ala Thr Met Gln Leu Glu Glu Thr Met Phe Glu

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195 200 205
 Leu Lys Lys Asn Phe Thr Ile Ile Ile Val Thr His Asn Met Gln Gln
 210 215 220
 Ala Ala Arg Ala Ser Asp Tyr Thr Gly Phe Phe Tyr Leu Gly Asp Leu
 225 230 235 240
 Ile Glu Tyr Asp Lys Thr Ala Thr Ile Phe Gln Asn Ala Lys Leu Gln
 245 250 255
 Ser Thr Asn Asp Tyr Val Ser Gly His Phe Gly
 260 265

 <210> 686
 <211> 459
 <212> PRT
 <213> Streptococcus pneumoniae

 <400> 686
 Met Ser Lys Ile Val Val Val Gly Ala Asn His Ala Gly Thr Ala Cys
 1 5 10 15
 Ile Asn Thr Met Leu Asp Asn Phe Gly Asn Glu Asn Glu Ile Val Val
 20 25 30
 Phe Asp Gln Asn Ser Asn Ile Ser Phe Leu Gly Cys Gly Met Ala Leu
 35 40 45
 Trp Ile Gly Glu Gln Ile Asp Gly Ala Glu Gly Leu Phe Tyr Ser Asp
 50 55 60
 Lys Glu Lys Leu Glu Ala Lys Gly Ala Lys Val Tyr Met Asn Ser Pro
 65 70 75 80
 Val Leu Ser Ile Asp Tyr Asp Asn Lys Val Val Thr Ala Glu Val Glu
 85 90 95
 Gly Lys Glu His Lys Glu Ser Tyr Glu Lys Leu Ile Phe Ala Thr Gly
 100 105 110
 Ser Thr Pro Ile Leu Pro Pro Ile Glu Gly Val Glu Ile Val Lys Gly

115	120	125
Asn Arg Glu Phe Lys Ala Thr Leu Glu Asn Val Gln Phe Val Lys Leu 130 135 140		
Tyr Gln Asn Ala Glu Glu Val Ile Asn Lys Leu Ser Asp Lys Ser Gln 145 150 155 160		
His Leu Asp Arg Ile Ala Val Val Gly Gly Tyr Ile Gly Val Glu 165 170 175		
Leu Ala Glu Ala Phe Glu Arg Leu Gly Lys Glu Val Val Leu Val Asp 180 185 190		
Ile Val Asp Thr Val Leu Asn Gly Tyr Tyr Asp Lys Asp Phe Thr Gln 195 200 205		
Met Met Ala Lys Asn Leu Glu Asp His Asn Ile Arg Leu Ala Leu Gly 210 215 220		
Gln Thr Val Lys Ala Ile Glu Gly Asp Gly Lys Val Glu Arg Leu Ile 225 230 235 240		
Thr Asp Lys Glu Ser Phe Asp Val Asp Met Val Ile Leu Ala Val Gly 245 250 255		
Phe Arg Pro Asn Thr Ala Leu Ala Gly Gly Lys Ile Glu Leu Phe Arg 260 265 270		
Asn Gly Ala Phe Leu Val Asp Lys Lys Gln Glu Thr Ser Ile Pro Asp 275 280 285		
Val Tyr Ala Val Gly Asp Cys Ala Thr Val Tyr Asp Asn Ala Arg Lys 290 295 300		
Asp Thr Ser Tyr Ile Ala Leu Ala Ser Asn Ala Val Arg Thr Gly Ile 305 310 315 320		
Val Gly Ala Tyr Asn Ala Cys Gly His Glu Leu Glu Gly Ile Gly Val 325 330 335		

Gln Gly Ser Asn Gly Ile Ser Ile Tyr Gly Leu His Met Val Ser Thr
 340 345 350

Gly Leu Thr Leu Glu Lys Ala Lys Ala Ala Gly Tyr Asn Ala Thr Glu
 355 360 365

Thr Gly Phe Asn Asp Leu Gln Lys Pro Glu Phe Met Lys His Asp Asn
 370 375 380

His Glu Val Ala Ile Lys Ile Val Phe Asp Lys Asp Ser Arg Glu Ile
 385 390 395 400

Leu Gly Ala Gln Met Val Ser His Asp Ile Ala Ile Ser Met Gly Ile
 405 410 415

His Met Phe Ser Leu Ala Ile Gln Glu His Val Thr Ile Asp Lys Leu
 420 425 430

Ala Leu Thr Asp Leu Phe Phe Leu Pro His Phe Asn Lys Pro Tyr Asn
 435 440 445

Tyr Ile Thr Met Ala Ala Leu Thr Ala Glu Lys
 450 455

<210> 687

<211> 404

<212> PRT

<213> Streptococcus pneumoniae

<400> 687

Met Glu Ala Phe Thr Gln Met Ala Lys Glu Lys Tyr Asp Arg Ser Lys
 1 5 10 15

Pro His Val Asn Ile Gly Thr Ile Gly His Val Asp His Gly Lys Thr
 20 25 30

Thr Leu Thr Ala Ala Ile Thr Thr Val Leu Ala Arg Arg Leu Pro Ser
 35 40 45

Ser Val Asn Gln Pro Lys Asp Tyr Ala Ser Ile Asp Ala Ala Pro Glu
 50 55 60

Glu Arg Glu Arg Gly Ile Thr Ile Asn Thr Ala His Val Glu Tyr Glu
 65 70 75 80
 Thr Glu Lys Arg His Tyr Ala His Ile Asp Ala Pro Gly His Ala Asp
 85 90 95
 Tyr Val Lys Asn Met Ile Thr Gly Ala Ala Gln Met Asp Gly Ala Ile
 100 105 110
 Leu Val Val Ala Ser Thr Asp Gly Pro Met Pro Gln Thr Arg Glu His
 115 120 125
 Ile Leu Leu Ser Arg Gln Val Gly Val Lys His Leu Ile Val Phe Met
 130 135 140
 Asn Lys Val Asp Leu Val Asp Asp Glu Glu Leu Leu Glu Leu Val Glu
 145 150 155 160
 Met Glu Ile Arg Asp Leu Leu Ser Glu Tyr Asp Phe Pro Gly Asp Asp
 165 170 175
 Leu Pro Val Ile Gln Gly Ser Ala Leu Lys Ala Leu Glu Gly Asp Ser
 180 185 190
 Lys Tyr Glu Asp Ile Val Met Glu Leu Met Asn Thr Val Asp Glu Tyr
 195 200 205
 Ile Pro Glu Pro Glu Arg Asp Thr Asp Lys Pro Leu Leu Leu Pro Val
 210 215 220
 Glu Asp Val Phe Ser Ile Thr Gly Arg Gly Thr Val Ala Ser Gly Arg
 225 230 235 240
 Ile Asp Arg Gly Ile Val Lys Val Asn Asp Glu Ile Glu Ile Val Gly
 245 250 255
 Ile Lys Glu Glu Thr Gln Lys Ala Val Val Thr Gly Val Glu Met Phe
 260 265 270
 Arg Lys Gln Leu Asp Glu Gly Leu Ala Gly Asp Asn Val Gly Val Leu
 275 280 285

Leu Arg Gly Val Gln Arg Asp Glu Ile Glu Arg Gly Gln Val Ile Ala
 290 295 300

Lys Pro Gly Ser Ile Asn Pro His Thr Lys Phe Lys Gly Glu Val Tyr
 305 310 315 320

Ile Leu Thr Lys Glu Glu Gly Gly Arg His Thr Pro Phe Phe Asn Asn
 325 330 335

Tyr Arg Pro Gln Phe Tyr Phe Arg Thr Thr Asp Val Thr Gly Ser Ile
 340 345 350

Glu Leu Pro Ala Gly Thr Glu Met Val Met Pro Gly Asp Asn Val Thr
 355 360 365

Ile Asp Val Glu Leu Ile His Pro Ile Ala Val Glu Gln Gly Thr Thr
 370 375 380

Phe Ser Ile Arg Glu Gly Gly Arg Thr Val Gly Ser Gly Met Val Thr
 385 390 395 400

Glu Ile Glu Ala

<210> 688

<211> 289

<212> PRT

<213> Streptococcus pneumoniae

<400> 688

Met Asp Phe Thr Trp Ala Leu Lys Tyr Ala Thr Glu Phe Leu Gly Thr
 1 5 10 15

Ala Ile Leu Ile Ile Leu Gly Asn Gly Ala Val Ala Asn Val Glu Leu
 20 25 30

Lys Gly Thr Lys Gly His Gln Ser Gly Trp Ile Val Ile Ala Val Gly
 35 40 45

Tyr Gly Met Gly Val Met Ile Pro Ala Leu Met Phe Gly Asn Val Ser
 50 55 60

Gly Asn His Ile Asn Pro Ala Phe Thr Leu Gly Leu Ala Val Ser Gly
 65 70 75 80

Leu Phe Pro Trp Ala Gln Val Val Pro Tyr Ile Ile Ala Gln Val Leu
 85 90 95

Gly Ala Ile Phe Gly Gln Ala Leu Val Val Ala Thr Tyr Arg Pro Phe
 100 105 110

Tyr Leu Lys Thr Glu Asn Pro Asn Asn Ile Leu Gly Thr Phe Ser Thr
 115 120 125

Ile Ser Ser Ile Asp His Gly Thr Lys Glu Ser Arg Tyr Ala Ala Thr
 130 135 140

Val Asn Gly Leu Ile Asn Glu Phe Val Gly Ser Phe Val Leu Phe Phe
 145 150 155 160

Ala Ala Leu Gly Leu Thr Lys Asn Phe Phe Gly Ala Glu Val Leu Gln
 165 170 175

Phe Met Lys Gln Lys Ala Thr Glu Ala Gly Gln Thr Val Asp Phe Ser
 180 185 190

Asp Leu Ala Ile Lys Ala Gln Val Ala Pro His Thr Ala Ser Gly Leu
 195 200 205

Ser Val Ala His Leu Ala Leu Gly Phe Leu Val Met Ala Leu Val Thr
 210 215 220

Ser Leu Gly Gly Pro Thr Gly Pro Ala Leu Asn Pro Ala Arg Asp Leu
 225 230 235 240

Gly Pro Arg Leu Leu His Ala Phe Leu Pro Lys Ser Val Leu Gly Glu
 245 250 255

His Lys Gly Asp Ser Lys Trp Trp Tyr Ser Trp Val Pro Val Val Ala
 260 265 270

Pro Ile Ala Ala Ala Ile Ala Ala Val Ala Val Phe Lys Phe Leu Tyr
 275 280 285

Leu

<210> 689
 <211> 468
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 689

Met Ser Ser Gly Lys Ile Ala Gln Val Ile Gly Pro Val Val Asp Val
 1 5 10 15

Leu Phe Ala Ala Gly Glu Lys Leu Pro Glu Ile Asn Asn Ala Leu Val
 20 25 30

Val Tyr Lys Asn Asp Glu Arg Lys Thr Lys Ile Val Leu Glu Val Ala
 35 40 45

Leu Glu Leu Gly Asp Gly Met Val Arg Thr Ile Ala Met Glu Ser Thr
 50 55 60

Asp Gly Leu Thr Arg Gly Met Glu Val Leu Asp Thr Gly Arg Pro Ile
 65 70 75 80

Ser Val Pro Val Gly Lys Glu Thr Leu Gly Arg Val Phe Asn Val Leu
 85 90 95

Gly Asp Thr Ile Asp Leu Glu Ala Pro Phe Thr Glu Asp Ala Glu Arg
 100 105 110

Gln Pro Ile His Lys Lys Ala Pro Thr Phe Asp Glu Leu Ser Thr Ser
 115 120 125

Ser Glu Ile Leu Glu Thr Gly Ile Lys Val Ile Asp Leu Leu Ala Pro
 130 135 140

Tyr Leu Lys Gly Gly Lys Val Gly Leu Phe Gly Gly Ala Gly Val Gly
 145 150 155 160

Lys Thr Val Leu Ile Gln Glu Leu Ile His Asn Ile Ala Gln Glu His
 165 170 175

Gly Gly Ile Ser Val Phe Ala Gly Val Gly Glu Arg Thr Arg Glu Gly
 180 185 190

Asn Asp Leu Tyr Trp Glu Met Lys Glu Ser Gly Val Ile Glu Lys Thr
 195 200 205

Ala Met Val Phe Gly Gln Met Asn Glu Pro Pro Gly Ala Arg Met Arg
 210 215 220

Val Ala Leu Thr Gly Leu Thr Ile Ala Glu Tyr Phe Arg Asp Val Glu
 225 230 235 240

Gly Gln Asp Val Leu Leu Phe Ile Asp Asn Ile Phe Arg Phe Thr Gln
 245 250 255

Ala Gly Ser Glu Val Ser Ala Leu Leu Gly Arg Met Pro Ser Ala Val
 260 265 270

Gly Tyr Gln Pro Thr Leu Ala Thr Glu Met Gly Gln Leu Gln Glu Arg
 275 280 285

Ile Thr Ser Thr Lys Lys Gly Ser Val Thr Ser Ile Gln Ala Ile Tyr
 290 295 300

Val Pro Ala Asp Asp Tyr Thr Asp Pro Ala Pro Ala Thr Ala Phe Ala
 305 310 315 320

His Leu Asp Ser Thr Thr Asn Leu Glu Arg Lys Leu Val Gln Leu Gly
 325 330 335

Ile Tyr Pro Ala Val Asp Pro Leu Ala Ser Ser Ser Arg Ala Leu Ala
 340 345 350

Pro Glu Ile Val Gly Glu Glu His Tyr Ala Val Ala Ala Glu Val Lys
 355 360 365

Arg Val Leu Gln Arg Tyr His Glu Leu Gln Asp Ile Ile Ala Ile Leu
 370 375 380

Gly Met Asp Glu Leu Ser Asp Glu Glu Lys Thr Leu Val Ala Arg Ala

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385                      390                      395                      400

Arg Arg Ile Gln Phe Phe Leu Ser Gln Asn Phe Asn Val Ala Glu Gln
      405                      410                      415

Phe Thr Gly Gln Pro Gly Ser Tyr Val Pro Val Ala Glu Thr Val Arg
      420                      425                      430

Gly Phe Lys Glu Ile Leu Asp Gly Lys Tyr Asp His Leu Pro Glu Asp
      435                      440                      445

Ala Phe Arg Gly Val Gly Ser Ile Glu Asp Val Ile Ala Lys Ala Glu
      450                      455                      460

Lys Met Gly Phe
465

<210> 690
<211> 292
<212> PRT
<213> Streptococcus pneumoniae

<400> 690

Met Ala Val Ser Leu Asn Asp Ile Lys Thr Lys Ile Ala Ser Thr Lys
1      5      10      15

Asn Thr Ser Gln Ile Thr Asn Ala Met Gln Met Val Ser Ala Ala Lys
      20      25      30

Leu Gly Arg Ser Glu Glu Ala Ala Arg Asn Phe Gln Val Tyr Ala Gln
      35      40      45

Lys Val Arg Lys Leu Leu Thr Asp Ile Leu His Gly Asn Gly Ala Gly
      50      55      60

Ala Ser Thr Asn Pro Met Leu Ile Ser Arg Ser Val Lys Lys Thr Gly
      65      70      75      80

Tyr Ile Val Ile Thr Ser Asp Arg Gly Leu Val Gly Gly Tyr Asn Ser
      85      90      95

Ser Ile Leu Lys Ala Val Met Glu Leu Lys Glu Glu Tyr His Pro Asp

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100	105	110
Gly Lys Gly Phe Glu Met Ile Cys Ile Gly Gly Met Gly Ala Asp Phe		
115	120	125
Phe Lys Ala Arg Gly Ile Gln Pro Leu Tyr Glu Leu Arg Gly Leu Ser		
130	135	140
Asp Gln Pro Ser Phe Asp Gln Val Arg Lys Ile Ile Ser Lys Thr Val		
145	150	155
Glu Met Tyr Gln Asn Glu Leu Phe Asp Glu Leu Tyr Val Cys Tyr Asn		
165	170	175
His His Val Asn Thr Leu Thr Ser Gln Met Arg Val Glu Gln Met Leu		
180	185	190
Pro Ile Val Asp Leu Asp Pro Asn Glu Ala Asp Glu Glu Tyr Ser Leu		
195	200	205
Thr Phe Glu Leu Glu Thr Ser Arg Glu Glu Ile Leu Glu Gln Leu Leu		
210	215	220
Pro Gln Phe Ala Glu Ser Met Ile Tyr Gly Ala Ile Ile Asp Ala Lys		
225	230	235
Thr Ala Glu Asn Ala Ala Gly Met Thr Ala Met Gln Thr Ala Thr Asp		
245	250	255
Asn Ala Lys Lys Val Ile Asn Asp Leu Thr Ile Gln Tyr Asn Arg Ala		
260	265	270
Arg Gln Ala Ala Ile Thr Gln Glu Ile Thr Glu Ile Val Ala Gly Ala		
275	280	285
Ser Ala Leu Glu		
290		
<210> 691		
<211> 501		
<212> PRT		
<213> Streptococcus pneumoniae		

<400> 691

Met Ala Ile Asn Ala Gln Glu Ile Ser Ala Leu Ile Lys Gln Gln Ile
 1 5 10 15

Glu Asn Phe Lys Pro Asn Phe Asp Val Thr Glu Thr Gly Val Val Thr
 20 25 30

Tyr Ile Gly Asp Gly Ile Ala Arg Ala His Gly Leu Glu Asn Val Met
 35 40 45

Ser Gly Glu Leu Leu Asn Phe Glu Asn Gly Ser Tyr Gly Met Ala Gln
 50 55 60

Asn Leu Glu Ser Thr Asp Val Gly Ile Ile Ile Leu Gly Asp Phe Thr
 65 70 75 80

Asp Ile Arg Glu Gly Asp Thr Ile Arg Arg Thr Gly Lys Ile Met Glu
 85 90 95

Val Pro Val Gly Glu Ser Leu Ile Gly Arg Val Val Asp Pro Leu Gly
 100 105 110

Arg Pro Val Asp Gly Leu Gly Glu Ile His Thr Asp Lys Thr Arg Pro
 115 120 125

Val Glu Ala Pro Ala Pro Gly Val Met Gln Arg Lys Ser Val Ser Glu
 130 135 140

Pro Leu Gln Thr Gly Leu Lys Ala Ile Asp Ala Leu Val Pro Ile Gly
 145 150 155 160

Arg Gly Gln Arg Glu Leu Ile Ile Gly Asp Arg Gln Thr Gly Lys Thr
 165 170 175

Thr Ile Ala Ile Asp Thr Ile Leu Asn Gln Lys Asp Gln Asp Met Ile
 180 185 190

Cys Ile Tyr Val Ala Ile Gly Gln Lys Glu Ser Thr Val Arg Thr Gln
 195 200 205

Val Glu Thr Leu Arg Gln Tyr Gly Ala Leu Asp Tyr Thr Ile Val Val
 210 215 220
 Thr Ala Ser Ala Ser Gln Pro Ser Pro Leu Leu Phe Leu Ala Pro Tyr
 225 230 235 240
 Ala Gly Val Ala Met Ala Glu Glu Phe Met Tyr Gln Gly Lys His Val
 245 250 255
 Leu Ile Val Tyr Asp Asp Leu Ser Lys Gln Ala Val Ala Tyr Arg Glu
 260 265 270
 Leu Ser Leu Leu Leu Arg Arg Pro Pro Gly Arg Glu Ala Phe Pro Gly
 275 280 285
 Asp Val Phe Tyr Leu His Ser Arg Leu Leu Glu Arg Ser Ala Lys Val
 290 295 300
 Ser Asp Glu Leu Gly Gly Gly Ser Ile Thr Ala Leu Pro Phe Ile Glu
 305 310 315 320
 Thr Gln Ala Gly Asp Ile Ser Ala Tyr Ile Ala Thr Asn Val Ile Ser
 325 330 335
 Ile Thr Asp Gly Gln Ile Phe Leu Gly Asp Gly Leu Phe Asn Ala Gly
 340 345 350
 Ile Arg Pro Ala Ile Asp Ala Gly Ser Ser Val Ser Arg Val Gly Gly
 355 360 365
 Ser Ala Gln Ile Lys Ala Met Lys Lys Val Ala Gly Thr Leu Arg Ile
 370 375 380
 Asp Leu Ala Ser Tyr Arg Glu Leu Glu Ala Phe Thr Lys Phe Gly Ser
 385 390 395 400
 Asp Leu Asp Ala Ala Thr Gln Ala Lys Leu Asn Arg Gly Arg Arg Thr
 405 410 415
 Val Glu Val Leu Lys Gln Pro Val His Lys Pro Leu Pro Val Glu Lys
 420 425 430

Gln Val Thr Ile Leu Tyr Ala Leu Thr His Gly Phe Leu Asp Thr Val
 435 440 445

Pro Val Asp Asp Ile Val Arg Phe Glu Glu Glu Phe His Ala Phe Phe
 450 455 460

Asp Ala Gln His Pro Glu Ile Leu Glu Thr Ile Arg Asp Thr Lys Asp
 465 470 475 480

Leu Pro Glu Glu Ala Val Leu Asp Ala Ala Ile Thr Glu Phe Leu Asn
 485 490 495

Gln Ser Ser Phe Gln
 500

<210> 692

<211> 178

<212> PRT

<213> Streptococcus pneumoniae

<400> 692

Met Asp Lys Lys Thr Val Lys Val Ile Glu Lys Tyr Ser Met Pro Phe
 1 5 10 15

Val Gln Leu Val Leu Glu Lys Gly Glu Glu Asp Arg Ile Phe Ser Asp
 20 25 30

Leu Thr Gln Ile Lys Gln Val Val Glu Lys Thr Gly Leu Pro Ser Phe
 35 40 45

Leu Lys Gln Val Ala Val Asp Glu Ser Asp Lys Glu Lys Thr Ile Ala
 50 55 60

Phe Phe Gln Asp Ser Val Ser Pro Leu Leu Gln Asn Phe Ile Gln Val
 65 70 75 80

Leu Ala Tyr Asn His Arg Ala Asn Leu Phe Tyr Asp Val Leu Val Asp
 85 90 95

Cys Leu Asn Arg Leu Glu Lys Glu Thr Asn Arg Phe Glu Val Thr Ile
 100 105 110

Thr Ser Ala His Pro Leu Thr Asp Glu Gln Lys Thr Arg Leu Leu Pro
 115 120 125

Leu Ile Glu Lys Lys Met Ser Leu Lys Val Arg Ser Val Lys Glu Gln
 130 135 140

Ile Asp Glu Ser Leu Ile Gly Gly Phe Val Ile Phe Ala Asn His Lys
 145 150 155 160

Thr Ile Asp Val Ser Ile Lys Gln Gln Leu Lys Val Val Lys Glu Asn
 165 170 175

Leu Lys

<210> 693

<211> 164

<212> PRT

<213> Streptococcus pneumoniae

<400> 693

Met His Val Thr Val Gly Glu Leu Ile Gly Asn Phe Ile Leu Ile Thr
 1 5 10 15

Gly Ser Phe Ile Leu Leu Leu Val Leu Ile Lys Lys Phe Ala Trp Ser
 20 25 30

Asn Ile Thr Gly Ile Phe Glu Glu Arg Ala Glu Lys Ile Ala Ser Asp
 35 40 45

Ile Asp Arg Ala Glu Glu Ala Arg Gln Lys Ala Glu Val Leu Ala Gln
 50 55 60

Lys Arg Glu Asp Glu Leu Ala Gly Ser Arg Lys Glu Ala Lys Thr Ile
 65 70 75 80

Ile Glu Asn Ala Lys Glu Thr Ala Glu Gln Ser Lys Ala Asn Ile Leu
 85 90 95

Ala Asp Ala Lys Leu Glu Ala Gly His Leu Lys Glu Lys Ala Asn Gln
 100 105 110

Glu Ile Ala Gln Asn Lys Val Glu Ala Leu Gln Ser Val Lys Gly Glu
 115 120 125

Val Ala Asp Leu Thr Ile Ser Leu Ala Gly Lys Ile Ile Ser Gln Asn
 130 135 140

Leu Asp Ser His Ala His Lys Ala Leu Ile Asp Gln Tyr Ile Asp Gln
 145 150 155 160

Leu Gly Glu Ala

<210> 694
 <211> 466
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 694

Met Asp Ala Lys Leu Arg Tyr Lys Ala Lys Lys Ile Lys Ile Val Phe
 1 5 10 15

Phe Asp Ile Asp Asp Thr Leu Arg Asn Ser Lys Thr Gly Phe Ile Pro
 20 25 30

Thr Thr Ile Pro Thr Val Phe Lys Gln Leu Arg Glu Lys Gly Ile Leu
 35 40 45

Thr Gly Ile Ala Ser Gly Arg Gly Ile Phe Gly Val Val Pro Glu Ile
 50 55 60

Arg Asp Leu Lys Pro Asp Phe Phe Val Thr Leu Asn Gly Ala Tyr Ile
 65 70 75 80

Glu Asp Lys Lys Gly Gln Val Ile Tyr Gln His Gln Ile Glu Lys Ser
 85 90 95

Asp Val Glu Glu Tyr Ile Ser Trp Ala Lys Gln Glu Gly Ile Glu Tyr
 100 105 110

Gly Leu Val Gly Ser His Asp Ala Lys Leu Ser Thr Arg Thr Asp Met
 115 120 125

Met Ser Glu Ala Ile Asn Pro Ile Tyr Pro Asp Leu Asp Val Asp Pro
 130 135 140

Asp Phe His Glu Lys Glu Asp Ile Tyr Gln Met Trp Thr Phe Glu Asp
 145 150 155 160

Lys Gly Asp Asp Leu His Leu Pro Asp Ser Leu Ser Asp Lys Leu Arg
 165 170 175

Met Val Arg Trp His Gln His Ser Ser Asp Ile Val Pro Ile Ser Gly
 180 185 190

Ser Lys Ala Thr Gly Val Glu Lys Val Val Glu His Leu Gly Leu Lys
 195 200 205

Pro Glu Lys Val Met Val Phe Gly Asp Gly Leu Asn Asp Leu Glu Leu
 210 215 220

Phe Asp Tyr Ala Gly Ile Ser Val Ala Met Gly Ile Ser His Asp Lys
 225 230 235 240

Ile Lys Glu Lys Ala Asp Tyr Ile Thr Lys Thr Leu Glu Glu Asp Gly
 245 250 255

Ile Phe Ala Ala Leu Glu Val Phe Gly Met Val Glu Lys Glu Leu His
 260 265 270

Phe Pro Gln Val Asp Ile Glu Thr Val Glu Gly Pro Leu Ala Thr Ile
 275 280 285

Lys Thr Asn His Gly Asp Leu Arg Ile Lys Leu Phe Pro Glu His Ala
 290 295 300

Pro Lys Thr Val Ala Asn Phe Val Ser Leu Ser Lys Asp Gly Tyr Tyr
 305 310 315 320

Asp Gly Val Ile Phe His Arg Ile Ile Lys Asp Phe Met Ile Gln Gly
 325 330 335

Gly Asp Pro Thr Gly Thr Gly Met Gly Gly Glu Ser Ile Tyr Gly Glu
 340 345 350

Ser Phe Glu Asp Glu Phe Ser Glu Glu Leu Tyr Asn Ile Arg Gly Ala
 355 360 365

Leu Ser Met Ala Asn Ala Gly Pro Asn Thr Asn Gly Ser Gln Phe Phe
 370 375 380

Ile Val Gln Asn Gln His Leu Pro Tyr Ser Lys Lys Glu Ile Thr Arg
 385 390 395 400

Gly Gly Trp Pro Glu Pro Ile Ala Glu Ile Tyr Ala Asn Gln Gly Gly
 405 410 415

Thr Pro His Leu Asp Arg Arg His Thr Val Phe Gly Gln Leu Ala Asp
 420 425 430

Glu Ala Ser Tyr Ala Val Leu Asp Ala Ile Ala Ala Val Glu Thr Gly
 435 440 445

Ala Met Asp Lys Pro Val Glu Asp Val Val Ile Glu Thr Ile Glu Ile
 450 455 460

Glu Asp
 465

<210> 695
 <211> 79
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 695

Met Ala Gln Gln Arg Arg Gly Gly Phe Lys Arg Arg Lys Lys Val Asp
 1 5 10 15

Tyr Ile Ala Ala Asn Lys Ile Glu Tyr Val Asp Tyr Lys Asp Thr Glu
 20 25 30

Leu Leu Ser Arg Phe Val Ser Glu Arg Gly Lys Ile Leu Pro Arg Arg
 35 40 45

Val Thr Gly Thr Ser Ala Lys Asn Gln Arg Lys Val Thr Thr Ala Ile
 50 55 60

Lys Arg Ala Arg Val Met Ala Leu Met Pro Phe Val Asn Glu Asp
 65 70 75

<210> 696
 <211> 96
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 696

Met Ala Lys Tyr Glu Ile Leu Tyr Ile Ile Arg Pro Asn Ile Glu Glu
 1 5 10 15

Glu Ala Lys Asn Ala Leu Val Ala Arg Phe Asp Ser Ile Leu Thr Asp
 20 25 30

Asn Gly Ala Thr Val Val Glu Ser Lys Thr Trp Glu Lys Arg Arg Leu
 35 40 45

Ala Tyr Glu Ile Gln Asp Phe Arg Glu Gly Leu Tyr His Ile Val Asn
 50 55 60

Val Glu Ala Asn Asp Asp Ala Ala Leu Lys Glu Phe Asp Arg Leu Ser
 65 70 75 80

Lys Ile Asn Ala Asp Ile Leu Arg His Met Ile Val Lys Ile Asp Ala
 85 90 95

<210> 697
 <211> 531
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 697

Met Lys Arg Ile Val Phe Glu Leu Ile Phe Ile Ala Thr Thr Trp Tyr
 1 5 10 15

Ile Phe Leu Pro Pro Leu Asn Leu Thr Ser Trp Glu Phe Leu Phe Phe
 20 25 30

Leu Cys Gly His Leu Leu Val Val Ala Ile Leu Phe Gly Phe Gly Lys
 35 40 45

Gly Ile Asn Leu Val Lys Thr Val His Val Arg His Gly Lys Ala Glu
 50 55 60

Ala Ala Leu Asn Leu Glu Gly Phe Lys Ile Asn Arg Leu Gly Lys Ile
 65 70 75 80

Leu Leu Ala Ser Ile Gly Gly Ile Leu Leu Ala Ala Leu Val Ser
 85 90 95

Leu Val Thr Ser Ser Met Phe Gln Ala Lys Asn Tyr Ala Asn Val Val
 100 105 110

Thr Val Thr Glu Lys Asp Phe Thr Glu Phe Pro Lys Ser Asp Thr Ser
 115 120 125

Lys Val Pro Ile Leu Asp Arg Ser Thr Ala Glu Lys Ile Gly Asp Arg
 130 135 140

Tyr Leu Gly Ser Leu Thr Asp Lys Val Ser Gln Tyr Val Ala Ala Asp
 145 150 155 160

Thr Tyr Thr Gln Leu Thr Ile Asp Gly Lys Pro Tyr Arg Val Thr Pro
 165 170 175

Leu Glu Tyr Ala Asp Pro Ile Lys Trp Phe Asn Asn Gln Ala Lys Gly
 180 185 190

Ile Gly Glu Tyr Ile Lys Val Asp Met Val Thr Gly Asn Ala Asp Leu
 195 200 205

Val Asp Leu Lys Thr Pro Ile Lys Tyr Ser Asp Ser Glu Tyr Phe Asn
 210 215 220

Arg Asp Val Lys Arg His Leu Arg Leu Lys Tyr Pro Thr Lys Ile Phe
 225 230 235 240

Lys Thr Pro Ser Phe Glu Val Asp Asp Glu Gly Asn Pro Phe Tyr Val
 245 250 255

Ala Thr Val Tyr Gln Lys Gln Phe Gly Leu Ala Val Pro Arg Pro Ala
 260 265 270

Ser Val Ile Ile Leu Asp Ala Thr Asn Gly Glu Thr Lys Glu Tyr Ser
 275 280 285
 Leu Ser Asp Val Pro Glu Trp Val Asp Arg Ile Tyr Pro Ala Glu Glu
 290 295 300
 Thr Ile Glu Gln Ile Asn Tyr Asn Gly Lys Tyr Lys Asp Gly Phe Leu
 305 310 315 320
 Asn Ala Met Ile Ser Lys Lys Asn Val Thr Gln Thr Thr Asn Gly Tyr
 325 330 335
 Asn Tyr Leu Ser Ile Gly Asn Asp Ile Tyr Leu Tyr Thr Gly Val Thr
 340 345 350
 Ser Ala Asn Ala Asp Glu Ser Asn Leu Gly Phe Ile Leu Glu Asn Met
 355 360 365
 Arg Thr Gly Glu Ile Thr Lys Tyr Ser Leu Ala Ser Ala Thr Glu Glu
 370 375 380
 Ser Ala Arg Glu Ser Ala Glu Gly Ala Val Gln Glu Lys Ser Tyr Lys
 385 390 395 400
 Ala Thr Phe Pro Ile Leu Ile Asn Leu Asn Asp Lys Pro Leu Tyr Ile
 405 410 415
 Met Gly Leu Lys Asp Asn Ala Gly Leu Val Lys Glu Tyr Ala Leu Val
 420 425 430
 Asp Ala Val Glu Tyr Gln Asn Val Ile Val Ala Thr Thr Val Glu Glu
 435 440 445
 Met Leu Ser Lys Tyr Ala Asn Lys Asn Asp Leu Glu Ile Asp Asn Ala
 450 455 460
 Thr Thr Glu Ser Ile Asn Gly Val Val Ala Asp Leu Lys Ser Ala Val
 465 470 475 480
 Ile Lys Gly Asp Thr Val Tyr Phe Phe Lys Val Asp Gly Lys Ile Tyr

485	490	495
Lys Val Lys Ala Ser Val Ser Asp	Asp Leu Pro Tyr Leu Glu Asn Gly	
500	505	510
Lys Thr Phe Glu Gly Gln Val Gly	Lys Asp Asn Tyr Leu Lys Thr Phe	
515	520	525
Lys Leu Arg		
530		
<210> 698		
<211> 914		
<212> PRT		
<213> Streptococcus pneumoniae		
<400> 698		
Met Thr Glu Arg Glu Ser Val Leu His	Thr Met Ser Arg Arg Arg His	
1	5	10 15
Met Ser Lys Glu Gln Lys Arg Gln Ala Phe Tyr Thr Gln Ser Pro Glu		
20	25	30
Glu Val Leu Gln Ala Val Asp Ala Thr Glu Gln Gly Leu Ser Ser Ser		
35	40	45
Glu Ala Glu Lys Arg Leu Ala Glu Phe Gly His Asn Glu Leu Glu Glu		
50	55	60
Gly Glu Lys Arg Ser Ile Leu Val Lys Phe Ile Glu Gln Phe Lys Asp		
65	70	75 80
Leu Met Ile Ile Ile Leu Val Ala Ala Ala Ile Leu Ser Val Val Thr		
85	90	95
Ser Gly Gly Glu Asp Ile Ala Asp Ala Ile Ile Ile Leu Ala Val Val		
100	105	110
Ile Ile Asn Ala Ala Phe Gly Val Tyr Gln Glu Gly Lys Ala Glu Glu		
115	120	125
Ala Ile Glu Ala Leu Lys Ser Met Ser Ser Pro Val Ala Arg Val Leu		

130	135	140
Arg Asp Gly His Met Ala Glu Ile Asp Ser Lys Glu Leu Val Pro Gly		
145	150	155 160
Asp Ile Val Ala Leu Glu Ala Gly Asp Val Val Pro Ala Asp Leu Arg		
	165	170 175
Leu Ile Glu Ala Asn Ser Leu Lys Ile Glu Glu Ala Ala Leu Thr Gly		
	180	185 190
Glu Ser Val Pro Val Glu Lys Asp Leu Ser Val Glu Leu Ala Thr Asp		
	195	200 205
Ala Gly Ile Gly Asp Arg Val Asn Met Ala Phe Gln Asn Ser Asn Val		
	210	215 220
Thr Tyr Gly Arg Gly Met Gly Val Val Val Asn Thr Gly Met Tyr Thr		
	225	230 235 240
Glu Val Gly His Ile Ala Gly Met Leu Gln Asp Ala Asp Glu Thr Asp		
	245	250 255
Thr Pro Leu Lys Gln Asn Leu Asn Asn Leu Ser Lys Val Leu Thr Tyr		
	260	265 270
Ala Ile Leu Val Ile Ala Leu Val Thr Phe Val Val Gly Val Phe Ile		
	275	280 285
Gln Gly Lys Asn Pro Leu Gly Glu Leu Leu Thr Ser Val Ala Leu Ala		
	290	295 300
Val Ala Ala Ile Pro Glu Gly Leu Pro Ala Ile Val Thr Ile Val Leu		
	305	310 315 320
Ser Leu Gly Thr Gln Val Leu Ala Lys Arg His Ser Ile Val Arg Lys		
	325	330 335
Leu Pro Ala Val Glu Thr Leu Gly Ser Thr Glu Ile Ile Ala Ser Asp		
	340	345 350

Lys Thr Gly Thr Leu Thr Met Asn Lys Met Thr Val Glu Lys Val Phe
 355 360 365
 Tyr Asp Ala Val Leu His Asp Ser Ala Asp Asp Ile Glu Leu Gly Leu
 370 375 380
 Glu Met Pro Leu Leu Arg Ser Val Val Leu Ala Asn Asp Thr Lys Ile
 385 390 395 400
 Asp Val Glu Gly Asn Leu Ile Gly Asp Pro Thr Glu Thr Ala Phe Ile
 405 410 415
 Gln Tyr Ala Leu Asp Lys Gly Tyr Asp Val Lys Gly Phe Leu Glu Lys
 420 425 430
 Tyr Pro Arg Val Ala Glu Leu Pro Phe Asp Ser Asp Arg Lys Leu Met
 435 440 445
 Ser Thr Val His Pro Leu Pro Asp Gly Arg Phe Leu Val Ala Val Lys
 450 455 460
 Gly Ala Pro Asp Gln Leu Leu Lys Arg Cys Leu Leu Arg Asp Lys Ala
 465 470 475 480
 Gly Asp Ile Ala Pro Ile Asp Glu Lys Val Thr Asn Leu Ile Arg Thr
 485 490 495
 Asn Asn Ser Glu Met Ala His Gln Ala Leu Arg Val Leu Ala Gly Ala
 500 505 510
 Tyr Lys Ile Ile Asp Ser Ile Pro Glu Asn Leu Thr Ser Glu Glu Leu
 515 520 525
 Glu Asn Asp Leu Ile Phe Thr Gly Leu Ile Gly Met Ile Asp Pro Glu
 530 535 540
 Arg Pro Glu Ala Ala Glu Ala Val Arg Val Ala Lys Glu Ala Gly Ile
 545 550 555 560
 Arg Pro Ile Met Ile Thr Gly Asp His Gln Asp Thr Ala Glu Ala Ile
 565 570 575

Ala Lys Arg Leu Gly Ile Ile Asp Ala Asn Asp Thr Glu Gly His Val
 580 585 590

Leu Thr Gly Ala Glu Leu Asn Glu Leu Ser Asp Glu Glu Phe Glu Lys
 595 600 605

Val Val Gly Gln Tyr Ser Val Tyr Ala Arg Val Ser Pro Glu His Lys
 610 615 620

Val Arg Ile Val Lys Ala Trp Gln Lys Gln Gly Lys Val Val Ala Met
 625 630 635 640

Thr Gly Asp Gly Val Asn Asp Ala Pro Ala Leu Lys Thr Ala Asp Ile
 645 650 655

Gly Ile Gly Met Gly Ile Thr Gly Thr Glu Val Ser Lys Gly Ala Ser
 660 665 670

Asp Met Ile Leu Ala Asp Asp Asn Phe Ala Thr Ile Ile Val Ala Val
 675 680 685

Glu Glu Gly Arg Lys Val Phe Ser Asn Ile Gln Lys Thr Ile Gln Tyr
 690 695 700

Leu Leu Ser Ala Asn Thr Ala Glu Val Leu Thr Ile Phe Leu Ser Thr
 705 710 715 720

Leu Phe Gly Trp Asp Val Leu Gln Pro Val His Leu Leu Trp Ile Asn
 725 730 735

Leu Val Thr Asp Thr Phe Pro Ala Ile Ala Leu Gly Val Glu Pro Ala
 740 745 750

Glu Pro Gly Val Met Asn His Lys Pro Arg Gly Arg Lys Ala Ser Phe
 755 760 765

Phe Ser Gly Gly Val Leu Ser Ser Ile Ile Tyr Gln Gly Val Leu Gln
 770 775 780

Ala Ala Leu Val Met Ser Val Tyr Gly Leu Ala Ile Ala Tyr Pro Val
 785 790 795 800

His Val Gly Asp Asn His Ala Ile His Ala Asp Ala Leu Thr Met Ala
805 810 815

Phe Ala Thr Leu Gly Leu Ile Gln Leu Phe His Ala Tyr Asn Val Lys
820 825 830

Ser Val Tyr Gln Ser Ile Leu Thr Val Gly Pro Phe Lys Ser Lys Thr
835 840 845

Phe Asn Trp Ser Ile Leu Val Ser Phe Ile Leu Leu Met Ala Thr Ile
850 855 860

Val Val Glu Pro Leu Glu Gly Ile Phe His Val Thr Lys Leu Asp Leu
865 870 875 880

Ser Gln Trp Gly Ile Val Met Ala Gly Ser Phe Ser Met Ile Ile Ile
885 890 895

Val Glu Ile Val Lys Phe Ile Gln Arg Lys Leu Gly Phe Asp Lys Asn
900 905 910

Ala Ile

<210> 699
<211> 292
<212> PRT
<213> Streptococcus pneumoniae

<400> 699

Met Ile Gly Arg Ile Ser Gly Met Asn Phe Gln Gln Leu Ser Asn Leu
1 5 10 15

Gln Tyr Trp Thr Ser Leu Phe Ala Ser Pro Trp Thr Ile Ala Ile Asn
20 25 30

Leu Ile Asp Ile Leu Ile Val Ala Tyr Ile Leu Tyr His Phe Thr Lys
35 40 45

Ala Ile Ala Gly Thr Lys Ile Met Ile Leu Val Arg Gly Val Leu Val
50 55 60

Phe Ile Leu Ala Gln Ile Leu Ala Asn Met Ile Gly Leu Thr Thr Ile
 65 70 75 80
 Ser Trp Leu Ile Asn Gln Ile Ile Thr Tyr Gly Val Ile Ala Ala Val
 85 90 95
 Val Ile Phe Ser Pro Glu Ile Arg Thr Gly Leu Glu Arg Leu Gly Arg
 100 105 110
 Ala Thr Asp Phe Phe Ser Asn Ala Pro Ile Ser Ala Glu Glu Gln Met
 115 120 125
 Ile Arg Ala Phe Val Lys Ser Val Glu Tyr Met Ser Pro Arg Lys Ile
 130 135 140
 Gly Ala Leu Val Ala Ile Gln Arg Val Arg Thr Leu Gln Glu Tyr Ile
 145 150 155 160
 Ser Thr Gly Ile Pro Leu Asp Ala Lys Ile Ser Ala Glu Leu Leu Ile
 165 170 175
 Asn Ile Phe Ile Pro Asn Thr Pro Leu His Asp Gly Ala Val Ile Ile
 180 185 190
 Lys Glu Glu Arg Ile Ala Val Thr Ser Ala Tyr Leu Pro Leu Thr Lys
 195 200 205
 Asn Thr Gly Ile Ser Lys Glu Phe Gly Thr Arg His Arg Ala Ala Ile
 210 215 220
 Gly Leu Ser Glu Val Ser Asp Ala Leu Thr Phe Val Val Ser Glu Glu
 225 230 235 240
 Thr Gly Gly Ile Ser Ile Thr Tyr Asn Gly Arg Phe Lys His Asn Leu
 245 250 255
 Thr Leu Asp Glu Phe Glu Thr Glu Leu Arg Glu Ile Leu Leu Pro Lys
 260 265 270
 Glu Glu Val Gly Leu Ser Phe Lys Glu Arg Leu Leu Gly Gly Trp Lys

275 280 285
 His Glu Lys Lys
 290
 <210> 700
 <211> 410
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 700
 Met Ser Thr Asn Arg Lys Asn Asp Met Met Val Tyr Cys Ser Phe Cys
 1 5 10 15
 Gly Lys Asn Gln Glu Glu Val Gln Lys Ile Ile Ala Gly Asn Asn Ala
 20 25 30
 Phe Ile Cys Asn Glu Cys Val Glu Leu Ala Gln Glu Ile Ile Arg Glu
 35 40 45
 Glu Leu Val Glu Glu Val Leu Ala Asp Leu Ser Glu Val Pro Lys Pro
 50 55 60
 Ile Glu Leu Leu His Ile Leu Asn His Tyr Val Ile Gly Gln Asp Arg
 65 70 75 80
 Ala Lys Arg Ala Leu Ala Val Ala Val Tyr Asn His Tyr Lys Arg Ile
 85 90 95
 Asn Phe His Asp Thr Arg Glu Glu Ser Glu Asp Val Asp Leu Gln Lys
 100 105 110
 Ser Asn Ile Leu Met Ile Gly Pro Thr Gly Ser Gly Lys Thr Phe Leu
 115 120 125
 Ala Gln Thr Leu Ala Lys Ser Leu Asn Val Pro Phe Ala Ile Ala Asp
 130 135 140
 Ala Thr Ala Leu Thr Glu Ala Gly Tyr Val Gly Glu Asp Val Glu Asn
 145 150 155 160
 Ile Leu Leu Lys Leu Leu Gln Val Ala Asp Phe Asn Ile Glu Arg Ala

165	170	175
Glu Arg Gly Ile Ile Tyr Val Asp Glu Ile Asp Lys Ile Ala Lys Lys 180 185 190		
Ser Glu Asn Val Ser Ile Thr Arg Asp Val Ser Gly Glu Gly Val Gln 195 200 205		
Gln Ala Leu Leu Lys Ile Ile Glu Gly Thr Val Ala Ser Val Pro Pro 210 215 220		
Gln Gly Gly Arg Lys His Pro Gln Gln Glu Met Ile Gln Val Asp Thr 225 230 235 240		
Lys Asn Ile Leu Phe Ile Val Gly Gly Ala Phe Asp Gly Ile Glu Glu 245 250 255		
Ile Val Lys Gln Arg Leu Gly Glu Lys Val Ile Gly Phe Gly Gln Asn 260 265 270		
Asn Lys Ala Ile Asp Glu Asn Ser Ser Tyr Met Gln Glu Ile Ile Ala 275 280 285		
Glu Asp Ile Gln Lys Phe Gly Ile Ile Pro Glu Leu Ile Gly Arg Leu 290 295 300		
Pro Val Phe Ala Ala Leu Glu Gln Leu Thr Val Asp Asp Leu Val Arg 305 310 315 320		
Ile Leu Lys Glu Pro Arg Asn Ala Leu Val Lys Gln Tyr Gln Thr Leu 325 330 335		
Leu Ser Tyr Asp Asp Val Glu Leu Glu Phe Asp Asp Glu Ala Leu Gln 340 345 350		
Glu Ile Ala Asn Lys Ala Ile Glu Arg Lys Thr Gly Ala Arg Gly Leu 355 360 365		
Arg Ser Ile Ile Glu Glu Thr Met Leu Asp Val Met Phe Glu Val Pro 370 375 380		

Ser Gln Glu Asn Val Lys Leu Val Arg Ile Thr Lys Glu Thr Val Asp
 385 390 395 400

Gly Thr Asp Lys Pro Ile Leu Glu Thr Ala
 405 410

<210> 701
 <211> 376
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 701

Met Val Glu Leu Asn Leu Lys Asn Ile Tyr Lys Lys Tyr Pro Asn Ser
 1 5 10 15

Glu His Tyr Ser Val Glu Asp Phe Asn Leu Asn Ile Lys Asp Lys Glu
 20 25 30

Phe Ile Val Phe Val Gly Pro Ser Gly Cys Gly Lys Ser Thr Thr Leu
 35 40 45

Arg Met Ile Ala Gly Leu Glu Asp Ile Thr Glu Gly Thr Ala Ser Ile
 50 55 60

Asp Gly Val Val Val Asn Asp Val Ala Pro Lys Asp Arg Asp Ile Ala
 65 70 75 80

Met Val Phe Gln Asn Tyr Ala Leu Tyr Pro His Met Thr Val Tyr Asp
 85 90 95

Asn Met Ala Phe Gly Leu Lys Leu Arg Lys Tyr Ser Lys Glu Asp Ile
 100 105 110

Asn Lys Arg Val Gln Glu Ala Ala Glu Ile Leu Gly Leu Lys Glu Phe
 115 120 125

Leu Glu Arg Lys Pro Ala Asp Leu Ser Gly Gly Gln Arg Gln Arg Val
 130 135 140

Ala Met Gly Arg Ala Ile Val Arg Asp Ala Lys Val Phe Leu Met Asp
 145 150 155 160

Glu Pro Leu Ser Asn Leu Asp Ala Lys Leu Arg Val Ser Met Arg Ala
 165 170 175

Glu Ile Ala Lys Ile His Arg Arg Ile Gly Ala Thr Thr Ile Tyr Val
 180 185 190

Thr His Asp Gln Thr Glu Ala Met Thr Leu Ala Asp Arg Ile Val Ile
 195 200 205

Met Ser Ala Thr Lys Asn Pro Ala Gly Thr Gly Thr Ile Gly Arg Val
 210 215 220

Glu Gln Ile Gly Thr Pro Gln Glu Val Tyr Lys Asn Pro Val Asn Lys
 225 230 235 240

Phe Val Ala Gly Phe Ile Gly Ser Pro Ala Met Asn Phe Ile Thr Val
 245 250 255

Lys Leu Val Gly Ser Glu Ile Val Ser Asp Gly Phe Arg Leu Lys Val
 260 265 270

Pro Glu Gly Ala Leu Lys Val Leu Arg Glu Lys Gly Tyr Glu Gly Lys
 275 280 285

Glu Leu Ile Phe Gly Ile Arg Pro Glu Asp Val Asn Ala Glu Pro Ala
 290 295 300

Phe Leu Glu Thr Phe Pro Asp Cys Val Val Lys Ala Thr Ile Ser Val
 305 310 315 320

Ser Glu Leu Leu Gly Ser Glu Ser His Leu Tyr Cys Gln Val Gly Lys
 325 330 335

Asp Glu Phe Val Ala Lys Val Asp Ala Arg Asp Tyr Leu Gln Thr Gly
 340 345 350

Ala Thr Val Glu Leu Gly Phe Asp Leu Asn Lys Ala His Phe Phe Asp
 355 360 365

Val Glu Thr Glu Lys Thr Ile Tyr
 370 375

<210> 702
 <211> 524
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 702
 Met Lys Phe Asn Glu Leu Asn Leu Ser Ala Asp Leu Leu Ala Glu Ile
 1 5 10 15
 Glu Lys Ala Gly Phe Val Glu Ala Ser Pro Ile Gln Glu Gln Thr Ile
 20 25 30
 Pro Leu Ala Leu Glu Gly Lys Asp Val Ile Gly Gln Ala Gln Thr Gly
 35 40 45
 Thr Gly Lys Thr Ala Ala Phe Gly Leu Pro Thr Leu Glu Lys Ile Arg
 50 55 60
 Thr Glu Glu Ala Thr Ile Gln Ala Leu Val Ile Ala Pro Thr Arg Glu
 65 70 75 80
 Leu Ala Val Gln Ser Gln Glu Glu Leu Phe Arg Phe Gly Arg Ser Lys
 85 90 95
 Gly Val Lys Val Arg Ser Val Tyr Gly Gly Ser Ser Ile Glu Lys Gln
 100 105 110
 Ile Lys Ala Leu Lys Ser Gly Ala His Ile Val Val Gly Thr Pro Gly
 115 120 125
 Arg Leu Leu Asp Leu Ile Lys Arg Lys Ala Leu Lys Leu Gln Asp Ile
 130 135 140
 Glu Thr Leu Ile Leu Asp Glu Ala Asp Glu Met Leu Asn Met Gly Phe
 145 150 155 160
 Leu Glu Asp Ile Glu Ala Ile Ile Ser Arg Val Pro Glu Asn Arg Gln
 165 170 175
 Thr Leu Leu Phe Ser Ala Thr Met Pro Asp Ala Ile Lys Arg Ile Gly
 180 185 190

Val Gln Phe Met Lys Ala Pro Glu His Val Lys Ile Ala Ala Lys Glu
 195 200 205
 Leu Thr Thr Glu Leu Val Asp Gln Tyr Tyr Ile Arg Val Lys Glu Gln
 210 215 220
 Glu Lys Phe Asp Thr Met Thr Arg Leu Met Asp Val Ala Gln Pro Glu
 225 230 235 240
 Leu Ala Ile Val Phe Gly Arg Thr Lys Arg Arg Val Asp Glu Leu Thr
 245 250 255
 Arg Gly Leu Lys Ile Arg Gly Phe Arg Ala Glu Gly Ile His Gly Asp
 260 265 270
 Leu Asp Gln Asn Lys Arg Leu Arg Val Leu Arg Asp Phe Lys Asn Gly
 275 280 285
 Asn Leu Asp Val Leu Val Ala Thr Asp Val Ala Ala Arg Gly Leu Asp
 290 295 300
 Ile Ser Gly Val Thr His Val Tyr Asn Tyr Asp Ile Pro Gln Asp Pro
 305 310 315 320
 Glu Ser Tyr Val His Arg Ile Gly Arg Thr Gly Arg Ala Gly Lys Ser
 325 330 335
 Gly Gln Ser Ile Thr Phe Val Ala Pro Asn Glu Met Gly Tyr Leu Gln
 340 345 350
 Ile Ile Glu Asn Leu Thr Lys Lys Arg Met Lys Gly Leu Lys Pro Ala
 355 360 365
 Ser Val Glu Glu Ser Phe Gln Ser Lys Lys Gln Val Ala Leu Lys Lys
 370 375 380
 Ile Glu Arg Asp Phe Ala Asp Glu Thr Ile Arg Ala Asn Phe Glu Lys
 385 390 395 400
 Phe Gly Lys Asp Ala Arg Lys Leu Ala Ala Glu Phe Thr Pro Glu Glu
 405 410 415

Leu Ala Met Tyr Ile Leu Ser Leu Thr Val Gln Asp Pro Asp Ser Leu
 420 425 430

Pro Glu Val Glu Ile Ala Arg Glu Lys Pro Leu Pro Phe Lys Pro Ser
 435 440 445

Gly Asn Gly Phe Gly Gly Lys Ala Lys Gly Gly Arg Gly Gly Arg Arg
 450 455 460

Gly Asp Asp Arg Arg Glu Arg Asp Arg Arg Gly Asn Gly Arg Arg Asp
 465 470 475 480

Glu Phe Lys Lys Gly Ser Arg Gly Asn Asp Arg Phe Asp Lys Glu Lys
 485 490 495

Arg Tyr Arg Lys Asp Asn Lys Lys Pro Arg Asn Thr Leu Ser Glu Lys
 500 505 510

Gln Thr Gly Phe Val Ile Arg Asn Lys Gly Asp Lys
 515 520

<210> 703

<211> 438

<212> PRT

<213> Streptococcus pneumoniae

<400> 703

Met Leu Thr Tyr Asp Leu Ile Val Ile Gly Phe Gly Lys Ala Gly Lys
 1 5 10 15

Thr Leu Ala Gly Lys Leu Ala Ser Ala Gly Lys Lys Val Ala Leu Val
 20 25 30

Glu Arg Ser Lys Ala Met Tyr Gly Gly Thr Cys Ile Asn Ile Gly Cys
 35 40 45

Ile Pro Thr Lys Thr Leu Leu Val Ala Ala Glu Lys Asp Leu Ser Phe
 50 55 60

Glu Glu Val Ile Ala Thr Lys Asn Thr Ile Thr Gly Arg Leu Asn Gly
 65 70 75 80

Lys	Asn	Tyr	Ala	Thr	Val	Ala	Gly	Thr	Gly	Val	Asp	Ile	Phe	Asp	Ala
			85						90			95			
Glu	Ala	His	Phe	Leu	Ser	Asn	Lys	Val	Ile	Glu	Ile	Gln	Ala	Gly	Asp
			100						105			110			
Glu	Lys	Lys	Glu	Leu	Thr	Ala	Glu	Thr	Ile	Val	Ile	Asn	Thr	Gly	Ala
			115						120			125			
Val	Ser	Asn	Val	Leu	Pro	Ile	Pro	Gly	Leu	Ala	Thr	Ser	Lys	Asn	Ile
			130						135			140			
Phe	Asp	Ser	Thr	Gly	Ile	Gln	Ser	Leu	Asp	Lys	Leu	Pro	Glu	Lys	Leu
			145						150			155			
Gly	Ile	Leu	Gly	Gly	Gly	Asn	Ile	Gly	Leu	Glu	Phe	Ala	Gly	Leu	Tyr
			165						170			175			
Asn	Lys	Leu	Gly	Ser	Lys	Val	Thr	Val	Leu	Asp	Ala	Leu	Asp	Thr	Phe
			180						185			190			
Leu	Pro	Arg	Ala	Glu	Pro	Ser	Ile	Ala	Ala	Leu	Ala	Lys	Gln	Tyr	Met
			195						200			205			
Glu	Glu	Asp	Gly	Ile	Glu	Leu	Leu	Gln	Asn	Ile	His	Thr	Thr	Glu	Ile
			210						215			220			
Lys	Asn	Asp	Gly	Asp	Gln	Val	Leu	Val	Val	Thr	Glu	Asp	Glu	Thr	Tyr
			225						230			235			
Arg	Phe	Asp	Ala	Leu	Leu	Tyr	Ala	Thr	Gly	Arg	Lys	Pro	Asn	Val	Glu
			245						250			255			
Pro	Leu	Gln	Leu	Glu	Asn	Thr	Asp	Ile	Glu	Leu	Thr	Glu	Arg	Gly	Ala
			260						265			270			
Ile	Lys	Val	Asp	Lys	His	Cys	Gln	Thr	Asn	Val	Pro	Gly	Val	Phe	Ala
			275						280			285			
Val	Gly	Asp	Val	Asn	Gly	Gly	Leu	Gln	Phe	Thr	Tyr	Ile	Ser	Leu	Asp

290 295 300
 Asp Phe Arg Val Val Tyr Ser Tyr Leu Ala Gly Asp Gly Ser Tyr Thr
 305 310 315 320
 Leu Glu Asp Arg Leu Asn Val Pro Asn Thr Met Phe Ile Thr Pro Ala
 325 330 335
 Leu Ser Gln Val Gly Leu Thr Glu Ser Gln Ala Ala Asp Leu Lys Leu
 340 345 350
 Pro Tyr Ala Val Lys Glu Ile Pro Val Ala Ala Met Pro Arg Gly His
 355 360 365
 Val Asn Gly Asp Leu Arg Gly Ala Phe Lys Ala Val Val Asn Thr Glu
 370 375 380
 Thr Lys Glu Ile Leu Gly Ala Ser Ile Phe Ser Glu Gly Ser Gln Glu
 385 390 395 400
 Ile Ile Asn Ile Ile Thr Val Ala Met Asp Asn Lys Ile Pro Tyr Thr
 405 410 415
 Tyr Phe Thr Lys Gln Ile Phe Thr His Pro Thr Leu Ala Glu Asn Leu
 420 425 430
 Asn Asp Leu Phe Ala Ile
 435
 <210> 704
 <211> 778
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 704
 Met Asp Lys Asn Lys Ile Met Gly Leu Thr Gln Arg Glu Val Lys Glu
 1 5 10 15
 Arg Gln Ala Glu Gly Leu Val Asn Asp Phe Thr Ala Ser Ala Ser Thr
 20 25 30
 Ser Thr Trp Gln Ile Val Lys Arg Asn Val Phe Thr Leu Phe Asn Ala

35	40	45
Leu Asn Phe Ala Ile Ala 50	Leu Ala Leu Ala Phe 55	Val Gln Ala Trp Ser 60
Asn Leu Val Phe Phe Ala 65	Val Ile Cys Phe 70	Asn Ala Phe Ser Gly Ile 75 80
Val Thr Glu Leu Arg Ala Lys His Met 85	Val Asp Lys 90	Leu Asn Leu Met 95
Thr Lys Glu Lys Val Lys Thr Ile Arg Asp Gly Gln Glu Val Ala Leu 100	105	110
Asn Pro Glu Glu Leu Val Leu Gly Asp Val Ile Arg Leu Ser Ala Gly 115	120	125
Glu Gln Ile Pro Ser Asp Ala Leu Val Leu Glu Gly Phe Ala Glu Val 130	135	140
Asn Glu Ala Met Leu Thr Gly Glu Ser Asp Leu Val Gln Lys Glu Val 145	150	155 160
Asp Gly Leu Leu Leu Ser Gly Ser Phe Leu Ala Ser Gly Ser Val Leu 165	170	175
Ser Gln Val His His Val Gly Ala Asp Asn Tyr Ala Ala Lys Leu Met 180	185	190
Leu Glu Ala Lys Thr Val Lys Pro Ile Asn Ser Arg Ile Met Lys Ser 195	200	205
Leu Asp Lys Leu Ala Gly Phe Thr Gly Lys Ile Ile Ile Pro Phe Gly 210	215	220
Leu Ala Leu Leu Leu Glu Ala Leu Leu Leu Lys Gly Leu Pro Leu Lys 225	230	235 240
Ser Ser Val Val Asn Ser Ser Thr Ala Leu Leu Gly Met Leu Pro Lys 245	250	255

Gly Ile Ala Leu Leu Thr Ile Thr Ser Leu Leu Thr Ala Val Ile Lys
 260 265 270

Leu Gly Leu Lys Lys Val Leu Val Gln Glu Met Tyr Ser Val Glu Thr
 275 280 285

Leu Ala Arg Val Asp Met Leu Cys Leu Asp Lys Thr Gly Thr Ile Thr
 290 295 300

Gln Gly Lys Met Gln Val Glu Ala Val Leu Pro Leu Thr Glu Thr Tyr
 305 310 315 320

Gly Glu Glu Ala Ile Ala Ser Ile Leu Thr Ser Tyr Met Ala His Ser
 325 330 335

Glu Asp Lys Asn Pro Thr Ala Gln Ala Ile Arg Gln Arg Phe Val Gly
 340 345 350

Asp Val Ala Tyr Pro Met Ile Ser Asn Leu Pro Phe Ser Ser Asp Arg
 355 360 365

Lys Trp Gly Ala Met Glu Leu Glu Gly Leu Gly Thr Val Phe Leu Gly
 370 375 380

Ala Pro Glu Met Leu Leu Asp Ser Glu Val Pro Glu Ala Arg Glu Ala
 385 390 395 400

Leu Glu Arg Gly Ser Arg Val Leu Val Leu Ala Leu Ser Gln Glu Lys
 405 410 415

Leu Asp His His Lys Pro Gln Lys Pro Ser Asp Ile Gln Ala Leu Ala
 420 425 430

Leu Leu Glu Ile Leu Asp Pro Ile Arg Glu Gly Ala Ala Glu Thr Leu
 435 440 445

Asp Tyr Leu Arg Ser Gln Glu Val Gly Leu Lys Ile Ile Ser Gly Asp
 450 455 460

Asn Pro Val Thr Val Ser Ser Ile Ala Gln Lys Ala Gly Phe Ala Asp
 465 470 475 480

Tyr His Ser Tyr Val Asp Cys Ser Lys Ile Thr Asp Glu Glu Leu Met
485 490 495

Ala Met Ala Glu Glu Thr Ala Ile Phe Gly Arg Val Ser Pro His Gln
500 505 510

Lys Lys Leu Ile Ile Gln Thr Leu Lys Lys Ala Gly His Thr Thr Ala
515 520 525

Met Thr Gly Asp Gly Val Asn Asp Ile Leu Ala Leu Arg Glu Ala Asp
530 535 540

Cys Ser Ile Val Met Ala Glu Gly Asp Pro Ala Thr Arg Gln Ile Ala
545 550 555 560

Asn Leu Val Leu Leu Asn Ser Asp Phe Asn Asp Val Pro Glu Ile Leu
565 570 575

Phe Glu Gly Arg Arg Val Val Asn Asn Ile Ala His Ile Ala Pro Ile
580 585 590

Phe Leu Ile Lys Thr Ile Tyr Ser Phe Leu Leu Ala Val Ile Cys Ile
595 600 605

Ala Ser Ala Leu Leu Gly Arg Ser Glu Trp Ile Leu Ile Phe Pro Phe
610 615 620

Ile Pro Ile Gln Ile Thr Met Ile Asp Gln Phe Val Glu Gly Phe Pro
625 630 635 640

Pro Phe Val Leu Thr Phe Glu Arg Asn Ile Lys Pro Val Glu Gln Asn
645 650 655

Phe Leu Arg Lys Ser Met Leu Arg Ala Leu Pro Ser Ala Leu Met Val
660 665 670

Val Phe Ser Val Leu Phe Val Lys Met Phe Gly Ala Ser Gln Gly Trp
675 680 685

Ser Glu Leu Glu Ile Ser Thr Leu Leu Tyr Tyr Leu Leu Gly Ser Ile
690 695 700

Gly Phe Leu Ser Val Phe Arg Ala Cys Met Pro Phe Thr Leu Trp Arg
 705 710 715 720

Val Leu Leu Ile Val Trp Ser Val Gly Gly Phe Leu Ala Thr Ala Leu
 725 730 735

Phe Pro Arg Ile Gln Lys Leu Leu Glu Ile Ser Thr Leu Thr Glu Gln
 740 745 750

Thr Leu Pro Val Tyr Gly Val Met Met Leu Val Phe Thr Val Ile Phe
 755 760 765

Ile Leu Thr Ser Arg Tyr Gln Ala Lys Lys
 770 775

<210> 705

<211> 89

<212> PRT

<213> Streptococcus pneumoniae

<400> 705

Met Ala Ile Ser Lys Glu Lys Lys Asn Glu Ile Ile Ala Gln Tyr Ala
 1 5 10 15

Arg His Glu Gly Asp Thr Gly Ser Val Glu Val Gln Val Ala Val Leu
 20 25 30

Thr Trp Glu Ile Asn His Leu Asn Glu His Ile Lys Gln His Lys Lys
 35 40 45

Asp His Ala Thr Tyr Arg Gly Leu Met Lys Lys Ile Gly Arg Arg Arg
 50 55 60

Asn Ile Leu Ala Tyr Leu Arg Lys Asn Asp Val Asn Arg Tyr Arg Glu
 65 70 75 80

Leu Ile Asn Ser Leu Gly Leu Arg Arg
 85

<210> 706

<211> 630

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 706

Met Thr Arg Tyr Gln Asp Asp Phe Tyr Asp Ala Ile Asn Gly Glu Trp
 1 5 10 15

Gln Gln Thr Ala Glu Ile Pro Ala Asp Lys Ser Gln Thr Gly Phe
 20 25 30

Val Asp Leu Asp Gln Glu Ile Glu Asp Leu Met Leu Ala Thr Thr Asp
 35 40 45

Lys Trp Leu Ala Gly Glu Glu Val Pro Glu Asp Ala Ile Leu Glu Asn
 50 55 60

Phe Val Lys Tyr His Arg Leu Val Arg Asp Phe Asp Lys Arg Glu Ala
 65 70 75 80

Asp Gly Ile Thr Pro Val Leu Pro Leu Leu Lys Glu Phe Gln Glu Leu
 85 90 95

Glu Thr Phe Ala Asp Phe Thr Ala Lys Leu Ala Glu Phe Glu Leu Ala
 100 105 110

Gly Lys Pro Asn Phe Leu Pro Phe Gly Val Ser Pro Asp Phe Met Asp
 115 120 125

Ala Arg Ile Asn Val Leu Trp Ala Ser Ala Pro Ser Thr Ile Leu Pro
 130 135 140

Asp Thr Thr Tyr Tyr Ala Glu Glu His Pro Gln Arg Glu Glu Leu Leu
 145 150 155 160

Thr Leu Trp Lys Glu Ser Ser Ala Asn Leu Leu Lys Ala Tyr Asp Phe
 165 170 175

Ser Asp Glu Glu Ile Glu Asp Leu Leu Glu Lys Arg Leu Glu Leu Asp
 180 185 190

Arg Arg Val Ala Ala Val Val Leu Ser Asn Glu Glu Ser Ser Glu Tyr
 195 200 205

Ala Lys Leu Tyr His Pro Tyr Ser Tyr Glu Asp Phe Lys Lys Phe Ala
 210 215 220
 Pro Ala Leu Pro Leu Asp Asp Phe Phe Lys Ala Val Ile Gly Gln Leu
 225 230 235 240
 Pro Asp Lys Val Ile Val Asp Glu Glu Arg Phe Trp Gln Ala Ala Glu
 245 250 255
 Gln Phe Tyr Ser Glu Glu Ala Trp Ser Leu Leu Lys Ala Thr Leu Ile
 260 265 270
 Leu Ser Val Val Asn Leu Ser Thr Ser Tyr Leu Thr Glu Asp Ile Arg
 275 280 285
 Val Leu Ser Gly Ala Tyr Ser Arg Ala Leu Ser Gly Val Pro Glu Ala
 290 295 300
 Lys Asp Lys Val Lys Ala Ala Tyr His Leu Ala Gln Glu Pro Phe Lys
 305 310 315 320
 Gln Ala Leu Gly Leu Trp Tyr Ala Arg Glu Lys Phe Ser Pro Glu Ala
 325 330 335
 Lys Ala Asp Val Glu Lys Lys Val Ala Thr Met Ile Asp Val Tyr Lys
 340 345 350
 Glu Arg Leu Leu Lys Asn Asp Trp Leu Thr Pro Glu Thr Cys Lys Gln
 355 360 365
 Ala Ile Val Lys Leu Asn Val Ile Lys Pro Tyr Ile Gly Tyr Pro Glu
 370 375 380
 Glu Leu Pro Ala Arg Tyr Lys Asp Lys Val Val Asn Glu Thr Ala Ser
 385 390 395 400
 Leu Phe Glu Asn Ala Leu Ala Phe Ala Arg Val Glu Ile Lys His Ser
 405 410 415
 Trp Ser Lys Trp Asn Gln Pro Val Asp Tyr Lys Glu Trp Gly Met Pro

420	425	430	
Ala His Met Val Asn Ala Tyr Tyr Asn Pro Gln Lys Asn Leu Ile Val			
435	440	445	
Phe Pro Ala Ala Ile Leu Gln Ala Pro Phe Tyr Asp Leu His Gln Ser			
450	455	460	
Ser Ser Ala Asn Tyr Gly Gly Ile Gly Ala Val Ile Ala His Glu Ile			
465	470	475	480
Ser His Ala Phe Asp Thr Asn Gly Ala Ser Phe Asp Glu Asn Gly Ser			
	485	490	495
Leu Lys Asp Trp Trp Thr Glu Ser Asp Tyr Ala Ala Phe Lys Glu Lys			
	500	505	510
Thr Gln Lys Val Ile Asp Gln Phe Asp Gly Gln Asp Ser Tyr Gly Ala			
515	520	525	
Thr Ile Asn Gly Lys Leu Thr Val Ser Glu Asn Val Ala Asp Leu Gly			
530	535	540	
Gly Ile Ala Ala Ala Leu Glu Ala Ala Lys Arg Glu Ala Asp Phe Ser			
545	550	555	560
Ala Glu Glu Phe Phe Tyr Asn Phe Gly Arg Ile Trp Arg Met Lys Gly			
	565	570	575
Arg Pro Glu Phe Met Lys Leu Leu Ala Ser Val Asp Val His Ala Pro			
	580	585	590
Ala Lys Leu Arg Val Asn Val Gln Val Pro Asn Phe Asp Asp Phe Phe			
595	600	605	
Thr Thr Tyr Asp Val Lys Glu Gly Asp Gly Met Trp Arg Ser Pro Glu			
610	615	620	
Glu Arg Val Ile Ile Trp			
625	630		

<210> 707
 <211> 230
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 707
 Met Val Lys Leu Val Phe Ala Arg His Gly Glu Ser Glu Trp Asn Lys
 1 5 10 15
 Ala Asn Leu Phe Thr Gly Trp Ala Asp Val Asp Leu Ser Glu Lys Gly
 20 25 30
 Thr Gln Gln Ala Ile Asp Ala Gly Lys Leu Ile Lys Glu Ala Gly Ile
 35 40 45
 Glu Phe Asp Gln Ala Tyr Thr Ser Val Leu Lys Arg Ala Ile Lys Thr
 50 55 60
 Thr Asn Leu Ala Leu Glu Ala Ser Asp Gln Leu Trp Val Pro Val Glu
 65 70 75 80
 Lys Ser Trp Arg Leu Asn Glu Arg His Tyr Gly Gly Leu Thr Gly Lys
 85 90 95
 Asn Lys Ala Glu Ala Ala Glu Gln Phe Gly Asp Glu Gln Val His Ile
 100 105 110
 Trp Arg Arg Ser Tyr Asp Val Leu Pro Pro Asn Met Asp Arg Asp Asp
 115 120 125
 Glu His Ser Ala His Thr Asp Arg Arg Tyr Ala Ser Leu Asp Asp Ser
 130 135 140
 Val Ile Pro Asp Ala Glu Asn Leu Lys Val Thr Leu Glu Arg Ala Leu
 145 150 155 160
 Pro Phe Trp Glu Asp Lys Ile Ala Pro Ala Leu Lys Asp Gly Lys Asn
 165 170 175
 Val Phe Val Gly Ala His Gly Asn Ser Ile Arg Ala Leu Val Lys His
 180 185 190

Ile Lys Gly Leu Ser Asp Asp Glu Ile Met Asp Val Glu Ile Pro Asn
 195 200 205

Phe Pro Pro Leu Val Phe Glu Phe Asp Glu Lys Leu Asn Val Val Ser
 210 215 220

Glu Tyr Tyr Leu Gly Lys
 225 230

<210> 708

<211> 179

<212> PRT

<213> Streptococcus pneumoniae

<400> 708

Met Ser Leu Lys Asp Arg Phe Asp Arg Phe Ile Asp Tyr Phe Thr Glu
 1 5 10 15

Asp Glu Asp Ser Ser Leu Pro Tyr Glu Lys Arg Asp Glu Pro Val Phe
 20 25 30

Thr Ser Val Asn Ser Ser Gln Glu Pro Ala Leu Pro Met Asn Gln Pro
 35 40 45

Ser Gln Ser Ala Gly Thr Lys Glu Asn Asn Ile Thr Arg Leu His Ala
 50 55 60

Arg Gln Gln Glu Leu Ala Asn Gln Ser Gln Arg Ala Thr Asp Lys Val
 65 70 75 80

Ile Ile Asp Val Arg Tyr Pro Arg Lys Tyr Glu Asp Ala Thr Glu Ile
 85 90 95

Val Asp Leu Leu Ala Gly Asn Glu Ser Ile Leu Ile Asp Phe Gln Tyr
 100 105 110

Met Thr Glu Val Gln Ala Arg Arg Cys Leu Asp Tyr Leu Asp Gly Ala
 115 120 125

Cys His Val Leu Ala Gly Asn Leu Lys Lys Val Ala Ser Thr Met Tyr
 130 135 140

Leu Leu Thr Pro Val Asn Val Ile Val Asn Val Glu Asp Ile Arg Leu
 145 150 155 160

Pro Asp Glu Asp Gln Gln Gly Glu Phe Gly Phe Asp Met Lys Arg Asn
 165 170 175

Arg Val Arg

<210> 709
 <211> 457
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 709

Met Ala Arg Glu Gly Phe Phe Thr Gly Leu Asp Ile Gly Thr Ser Ser
 1 5 10 15

Val Lys Val Leu Val Ala Glu Gln Arg Asn Gly Glu Leu Asn Val Ile
 20 25 30

Gly Val Ser Asn Ala Lys Ser Lys Gly Val Lys Asp Gly Ile Ile Val
 35 40 45

Asp Ile Asp Ala Ala Ala Thr Ala Ile Lys Ser Ala Ile Ser Gln Ala
 50 55 60

Glu Glu Lys Ala Gly Ile Ser Ile Lys Ser Val Asn Val Gly Leu Pro
 65 70 75 80

Gly Asn Leu Leu Gln Val Glu Pro Thr Gln Gly Met Ile Pro Val Thr
 85 90 95

Ser Asp Thr Lys Glu Ile Thr Asp Gln Asp Val Glu Asn Val Val Lys
 100 105 110

Ser Ala Leu Thr Lys Ser Met Thr Pro Asp Arg Glu Val Ile Thr Phe
 115 120 125

Ile Pro Glu Glu Phe Ile Val Asp Gly Phe Gln Gly Ile Arg Asp Pro
 130 135 140

Arg Gly Met Met Gly Val Arg Leu Glu Met Arg Gly Leu Leu Tyr Thr
 145 150 155 160

Gly Pro Arg Thr Ile Leu His Asn Leu Arg Lys Thr Val Glu Arg Ala
 165 170 175

Gly Val Gln Val Glu Asn Val Ile Ile Ser Pro Leu Ala Met Val Gln
 180 185 190

Ser Val Leu Asn Glu Gly Glu Arg Glu Phe Gly Ala Thr Val Ile Asp
 195 200 205

Met Gly Ala Gly Gln Thr Thr Val Ala Thr Ile Arg Asn Gln Glu Leu
 210 215 220

Gln Phe Thr His Ile Leu Gln Glu Gly Gly Asp Tyr Val Thr Lys Asp
 225 230 235 240

Ile Ser Lys Val Leu Lys Thr Ser Arg Lys Leu Ala Glu Gly Leu Lys
 245 250 255

Leu Asn Tyr Gly Glu Ala Tyr Pro Pro Leu Ala Ser Lys Glu Thr Phe
 260 265 270

Gln Val Glu Val Ile Gly Glu Val Glu Ala Val Glu Val Thr Glu Ala
 275 280 285

Tyr Leu Ser Glu Ile Ile Ser Ala Arg Ile Lys His Ile Leu Glu Gln
 290 295 300

Ile Lys Gln Glu Leu Asp Arg Arg Arg Leu Leu Asp Leu Pro Gly Gly
 305 310 315 320

Ile Val Leu Ile Gly Gly Asn Ala Ile Leu Pro Gly Met Val Glu Leu
 325 330 335

Ala Gln Glu Val Phe Gly Val Arg Val Lys Leu Tyr Val Pro Asn Gln
 340 345 350

Val Gly Ile Arg Asn Pro Ala Phe Ala His Val Ile Ser Leu Ser Glu
 355 360 365

Phe Ala Gly Gln Leu Thr Glu Val Asn Leu Leu Ala Gln Gly Ala Ile
 370 375 380

Lys Gly Glu Asn Asp Leu Ser His Gln Pro Ile Ser Phe Gly Gly Met
 385 390 395 400

Leu Gln Lys Thr Ala Gln Phe Val Gln Ser Thr Pro Val Gln Pro Ala
 405 410 415

Pro Ala Pro Glu Val Glu Pro Val Ala Pro Thr Glu Pro Met Ala Asp
 420 425 430

Phe Gln Gln Ala Ser Gln Asn Lys Pro Lys Leu Ala Asp Arg Phe Arg
 435 440 445

Gly Leu Ile Gly Ser Met Phe Asp Glu
 450 455

<210> 710

<211> 685

<212> PRT

<213> Streptococcus pneumoniae

<400> 710

Met Arg Leu Ile Cys Met Arg Lys Phe Asn Ser His Ser Ile Pro Ile
 1 5 10 15

Arg Leu Asn Leu Leu Phe Ser Ile Val Ile Leu Leu Phe Met Thr Ile
 20 25 30

Ile Gly Arg Leu Leu Tyr Met Gln Val Leu Asn Lys Asp Phe Tyr Glu
 35 40 45

Lys Lys Leu Ala Ser Ala Ser Gln Thr Lys Ile Thr Ser Ser Ser Ala
 50 55 60

Arg Gly Glu Ile Tyr Asp Ala Ser Gly Lys Pro Leu Val Glu Asn Thr
 65 70 75 80

Leu Lys Gln Val Val Ser Phe Thr Arg Ser Asn Lys Met Thr Ala Thr
 85 90 95

Asp Leu Lys Glu Thr Ala Lys Lys Leu Leu Thr Tyr Val Ser Ile Ser
 100 105 110

Ser Pro Asn Leu Thr Glu Arg Gln Leu Ala Asp Tyr Tyr Leu Ala Asp
 115 120 125

Pro Glu Ile Tyr Lys Lys Ile Val Glu Ala Leu Pro Ser Glu Lys Arg
 130 135 140

Leu Asp Ser Asp Gly Asn Arg Leu Ser Glu Ser Glu Leu Tyr Asn Asn
 145 150 155 160

Ala Val Asp Ser Val Gln Thr Ser Gln Leu Asn Tyr Thr Glu Asp Glu
 165 170 175

Lys Lys Glu Ile Tyr Leu Phe Ser Gln Leu Asn Ala Val Gly Asn Phe
 180 185 190

Ala Thr Gly Thr Ile Ala Thr Asp Pro Leu Asn Asp Ser Gln Val Ala
 195 200 205

Val Ile Ala Ser Ile Ser Lys Glu Met Pro Gly Ile Ser Ile Ser Thr
 210 215 220

Ser Trp Asp Arg Lys Val Leu Glu Thr Ser Leu Ser Ser Ile Val Gly
 225 230 235 240

Ser Val Ser Ser Glu Lys Ala Gly Leu Pro Ala Glu Glu Ala Glu Ala
 245 250 255

Tyr Leu Lys Lys Gly Tyr Ser Leu Asn Asp Arg Val Gly Thr Ser Tyr
 260 265 270

Leu Glu Lys Gln Tyr Glu Glu Thr Leu Gln Gly Lys Arg Ser Val Lys
 275 280 285

Glu Ile His Leu Asp Lys Tyr Gly Asn Met Glu Ser Val Asp Thr Ile
 290 295 300

Glu Glu Gly Ser Lys Gly Asn Asn Ile Lys Leu Thr Ile Asp Leu Ala
 305 310 315 320

Phe	Gln	Asp	Ser	Val	Asp	Ala	Leu	Leu	Lys	Ser	Tyr	Phe	Asn	Ser	His
			325						330					335	
Leu	Glu	Asn	Gly	Gly	Ala	Lys	Tyr	Ser	Glu	Gly	Val	Tyr	Ala	Val	Ala
			340					345					350		
Leu	Asn	Pro	Lys	Thr	Gly	Ala	Val	Leu	Ser	Met	Ser	Gly	Ile	Lys	His
			355				360					365			
Asp	Leu	Lys	Thr	Gly	Glu	Leu	Thr	Pro	Asp	Ser	Leu	Gly	Thr	Val	Thr
	370					375					380				
Asn	Val	Phe	Val	Pro	Gly	Ser	Val	Val	Lys	Ala	Ala	Thr	Ile	Ser	Ser
385					390					395					400
Gly	Trp	Glu	Asn	Gly	Val	Leu	Ser	Gly	Asn	Gln	Thr	Leu	Thr	Asp	Gln
			405					410						415	
Ser	Ile	Val	Phe	Gln	Gly	Ser	Ala	Pro	Ile	Asn	Ser	Trp	Tyr	Thr	Gln
			420					425					430		
Ala	Tyr	Gly	Ser	Phe	Pro	Ile	Thr	Ala	Val	Gln	Ala	Leu	Glu	Tyr	Ser
		435					440					445			
Ser	Asn	Thr	Tyr	Met	Val	Gln	Thr	Ala	Leu	Gly	Leu	Met	Gly	Gln	Thr
		450				455					460				
Tyr	Gln	Pro	Asn	Met	Phe	Val	Gly	Thr	Ser	Asn	Leu	Glu	Ser	Ala	Met
465					470					475					480
Glu	Lys	Leu	Arg	Ser	Thr	Phe	Gly	Glu	Tyr	Gly	Leu	Gly	Thr	Ala	Thr
				485				490						495	
Gly	Ile	Asp	Leu	Pro	Asp	Glu	Ser	Thr	Gly	Phe	Val	Pro	Lys	Glu	Tyr
			500					505					510		
Ser	Phe	Ala	Asn	Tyr	Ile	Thr	Asn	Ala	Phe	Gly	Gln	Phe	Asp	Asn	Tyr
		515					520					525			
Thr	Pro	Met	Gln	Leu	Ala	Gln	Tyr	Val	Ala	Thr	Ile	Ala	Asn	Asn	Gly

530 535 540
 Val Arg Val Ala Pro Arg Ile Val Glu Gly Ile Tyr Gly Asn Asn Asp
 545 550 555 560
 Lys Gly Gly Leu Gly Asp Leu Ile Gln Gln Leu Gln Pro Thr Glu Met
 565 570 575
 Asn Lys Val Asn Ile Ser Asp Ser Asp Met Ser Ile Leu His Gln Gly
 580 585 590
 Phe Tyr Gln Val Ala His Gly Thr Ser Gly Leu Thr Thr Gly Arg Ala
 595 600 605
 Phe Ser Asn Gly Ala Leu Val Ser Ile Ser Gly Lys Thr Gly Thr Ala
 610 615 620
 Glu Ser Tyr Val Ala Asp Gly Gln Gln Ala Thr Asn Thr Asn Ala Val
 625 630 635 640
 Ala Tyr Ala Pro Ser Asp Asn Pro Gln Ile Ala Val Ala Val Val Phe
 645 650 655
 Pro His Asn Thr Asn Leu Thr Asn Gly Val Gly Pro Ser Ile Ala Arg
 660 665 670
 Asp Ile Ile Asn Leu Tyr Gln Lys Tyr His Pro Met Asn
 675 680 685
 <210> 711
 <211> 301
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 711
 Met Ser Glu Leu Ile Ser Val Val Val Pro Ile Tyr Asn Thr Gly Lys
 1 5 10 15
 Tyr Leu Val Glu Cys Val Glu His Ile Leu Lys Gln Thr Tyr Gln Asn
 20 25 30
 Ile Glu Ile Ile Leu Val Asp Asp Gly Ser Thr Asp Asn Ser Gly Glu

35	40	45
Ile Cys Asp Ala Phe Met Met Gln Asp Asn Arg Val Arg Val Leu His		
50	55	60
Gln Glu Asn Lys Gly Gly Ala Ala Gln Ala Lys Asn Met Gly Ile Ser		
65	70	75
Val Ala Lys Gly Glu Tyr Ile Thr Ile Val Asp Ser Asp Asp Ile Val		
85	90	95
Lys Glu Asn Met Ile Glu Thr Leu Tyr Gln Gln Val Gln Glu Lys Asp		
100	105	110
Ala Asp Val Val Ile Gly Asn Tyr Tyr Asn Tyr Asp Glu Ser Asp Gly		
115	120	125
Asn Phe Tyr Phe Tyr Val Thr Gly Gln Asp Phe Cys Val Glu Glu Leu		
130	135	140
Ala Ile Gln Glu Ile Met Asn Arg Gln Ala Gly Asp Trp Lys Phe Asn		
145	150	155
Ser Ser Ala Phe Ile Leu Pro Thr Phe Lys Leu Ile Lys Lys Glu Leu		
165	170	175
Phe Asn Glu Val His Phe Ser Asn Gly Arg Arg Phe Asp Asp Glu Ala		
180	185	190
Thr Met His Arg Phe Tyr Leu Leu Ala Ser Lys Ile Val Phe Ile Asn		
195	200	205
Asp Asn Leu Tyr Leu Tyr Arg Arg Arg Ser Gly Ser Ile Met Arg Thr		
210	215	220
Glu Phe Asp Leu Ser Trp Ala Arg Asp Ile Val Glu Val Phe Ser Lys		
225	230	235
Lys Ile Ser Asp Cys Val Leu Ala Gly Leu Asp Val Ser Val Leu Arg		
245	250	255

Ile Arg Phe Val Asn Leu Leu Lys Asp Tyr Lys Gln Thr Leu Glu Tyr
 260 265 270

His Gln Leu Thr Asp Thr Glu Glu Tyr Lys Asp Ile Cys Phe Arg Leu
 275 280 285

Lys Leu Phe Phe Asp Ala Glu Gln Arg Asn Gly Lys Ser
 290 295 300

<210> 712
 <211> 104
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 712

Met Ala Lys Ala Ile Thr Asp Ala Thr Phe Glu Gln Glu Thr Lys Asp
 1 5 10 15

Gly Leu Val Leu Val Asp Phe Trp Ala Thr Trp Cys Gly Pro Cys Arg
 20 25 30

Met Gln Gly Pro Ile Leu Asp Lys Leu Ser Glu Glu Leu Ser Glu Asp
 35 40 45

Val Leu Lys Ile Val Lys Met Asp Val Asp Glu Asn Pro Asn Thr Ala
 50 55 60

Arg Ala Phe Gly Ile Met Ser Ile Pro Thr Leu Leu Phe Lys Lys Asp
 65 70 75 80

Gly Gln Val Val Lys Gln Val Ala Gly Val His Thr Ala Glu Gln Ile
 85 90 95

Lys Ala Ile Ile Ala Glu Leu Ser
 100

<210> 713
 <211> 202
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 713

Met Ser Asn Glu Lys Asn Thr Asn Thr Asn Val Glu Lys Lys Asp Ala

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1              5              10              15

Thr Val Val Ala His Glu Ile Lys Gly Glu Leu Thr Tyr Glu Asp Lys
      20              25              30

Val Ile Gln Lys Ile Ile Gly Leu Ser Leu Glu Asn Val Ser Gly Leu
      35              40              45

Leu Gly Ile Asp Gly Gly Phe Phe Ser Asn Leu Lys Glu Lys Ile Val
      50              55              60

Asn Ser Asp Asp Val Thr Ser Gly Val Asn Val Glu Val Gly Lys Thr
      65              70              75              80

Gln Val Ala Val Asp Leu Asn Val Ile Val Glu Tyr Gln Lys Asn Val
      85              90              95

Pro Ala Leu Tyr Ser Glu Ile Arg Glu Ile Val Ser Ser Glu Val Ala
      100              105              110

Lys Met Thr Asp Leu Glu Ile Val Glu Ile Asn Val Asn Val Val Asp
      115              120              125

Ile Lys Thr Lys Glu Gln His Glu Ala Asp Ser Val Ser Leu Gln Asp
      130              135              140

Arg Val Ser Asp Val Ala Glu Ser Thr Gly Glu Phe Thr Ser Glu Gln
      145              150              155              160

Phe Glu Lys Ala Lys Ser Gly Leu Gly Ser Gly Phe Ser Thr Val Gln
      165              170              175

Glu Lys Val Ser Glu Gly Val Glu Ala Val Lys Gly Ala Ala Asn Gly
      180              185              190

Val Val Ser His Glu Asn Thr Arg Val Asn
      195              200

<210> 714
<211> 583
<212> PRT
<213> Streptococcus pneumoniae

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<400> 714

Met Gln Asn Lys Gln Glu Gln Trp Thr Val Leu Lys Arg Leu Met Ser
 1 5 10 15

Tyr Leu Lys Pro Tyr Gly Leu Leu Thr Phe Leu Ala Leu Ser Phe Leu
 20 25 30

Leu Ala Thr Thr Val Ile Lys Ser Val Ile Pro Leu Val Ala Ser His
 35 40 45

Phe Ile Asp Gln Tyr Leu Ser Asn Leu Asn Gln Leu Ala Val Thr Val
 50 55 60

Leu Leu Val Tyr Tyr Gly Leu Tyr Ile Leu Gln Thr Val Val Gln Tyr
 65 70 75 80

Val Gly Asn Leu Leu Phe Ala Arg Val Ser Tyr Ser Ile Val Arg Asp
 85 90 95

Ile Arg Arg Asp Ala Phe Ala Asn Met Glu Lys Leu Gly Met Ser Tyr
 100 105 110

Phe Asp Lys Thr Pro Ala Gly Ser Ile Val Ser Arg Leu Thr Asn Asp
 115 120 125

Thr Glu Thr Ile Ser Asp Met Phe Ser Gly Ile Leu Ser Ser Phe Ile
 130 135 140

Ser Ala Val Phe Ile Phe Leu Thr Thr Leu Tyr Thr Met Leu Val Leu
 145 150 155 160

Asp Phe Arg Leu Thr Ala Leu Val Leu Leu Phe Leu Pro Leu Ile Phe
 165 170 175

Leu Leu Val Asn Leu Tyr Arg Lys Lys Ser Val Lys Ile Ile Glu Lys
 180 185 190

Thr Arg Ser Leu Leu Ser Asp Ile Asn Ser Lys Leu Ala Glu Asn Ile
 195 200 205

Glu Gly Ile Arg Ile Ile Gln Ala Phe Asn Gln Glu Lys Arg Leu Gln
 210 215 220
 Ala Glu Phe Asp Glu Ile Asn Gln Glu His Leu Val Tyr Ala Asn Arg
 225 230 235 240
 Ser Val Ala Leu Asp Ala Leu Phe Leu Arg Pro Ala Met Ser Leu Leu
 245 250 255
 Lys Leu Leu Gly Tyr Ala Val Leu Met Ala Tyr Phe Gly Tyr Arg Gly
 260 265 270
 Phe Ser Ile Gly Ile Thr Val Gly Thr Met Tyr Ala Phe Ile Gln Tyr
 275 280 285
 Ile Asn Arg Leu Phe Asp Pro Leu Ile Glu Val Thr Gln Asn Phe Ser
 290 295 300
 Thr Leu Gln Thr Ala Met Val Ser Ala Gly Arg Val Phe Ala Leu Ile
 305 310 315 320
 Asp Glu Arg Thr Tyr Glu Pro Leu Gln Glu Asn Gly Gln Ala Lys Val
 325 330 335
 Gln Glu Gly Asn Ile Arg Phe Glu His Val Cys Phe Ser Tyr Asp Gly
 340 345 350
 Lys His Pro Ile Leu Asp Asp Ile Ser Phe Ser Val Asn Lys Gly Glu
 355 360 365
 Thr Ile Ala Phe Val Gly His Thr Gly Ser Gly Lys Ser Ser Ile Ile
 370 375 380
 Asn Val Leu Met Arg Phe Tyr Glu Phe Gln Ser Gly Arg Val Leu Leu
 385 390 395 400
 Asp Asp Val Asp Ile Arg Asp Phe Ser Gln Glu Glu Leu Arg Lys Asn
 405 410 415
 Ile Gly Leu Val Leu Gln Glu Pro Phe Leu Tyr His Gly Thr Ile Lys
 420 425 430

Ser Asn Ile Ala Met Tyr Gln Glu Thr Ser Asp Glu Gln Val Gln Ala
 435 440 445

Ala Ala Ala Phe Val Asp Ala Asp Ser Phe Ile Gln Glu Leu Pro Gln
 450 455 460

Gly Tyr Asp Ser Pro Val Ser Glu Arg Gly Ser Ser Phe Ser Thr Gly
 465 470 475 480

Gln Arg Gln Leu Leu Ala Phe Ala Arg Thr Val Ala Ser Gln Pro Lys
 485 490 495

Ile Leu Ile Leu Asp Glu Ala Thr Ala Asn Ile Asp Ser Glu Thr Glu
 500 505 510

Ser Leu Val Gln Ala Ser Leu Ala Lys Met Arg Gln Gly Arg Thr Thr
 515 520 525

Ile Ala Ile Ala His Arg Leu Ser Thr Ile Gln Asp Ala Asn Cys Ile
 530 535 540

Tyr Val Leu Asp Lys Gly Arg Ile Ile Glu Ser Gly Thr His Glu Glu
 545 550 555 560

Leu Leu Ala Leu Gly Gly Thr Tyr His Lys Met Tyr Ser Leu Gln Ala
 565 570 575

Gly Ala Met Ala Asp Thr Leu
 580

<210> 715

<211> 153

<212> PRT

<213> Streptococcus pneumoniae

<400> 715

Met Lys Thr Lys Gln Leu Val Ala Ser Glu Glu Val Tyr Asp Phe Leu
 1 5 10 15

Lys Val Ile Trp Pro Asp Tyr Glu Thr Glu Ser Arg Tyr Asp Asn Leu
 20 25 30

Ser Leu Ile Val Cys Thr Leu Ser Asp Pro Asp Cys Val Arg Trp Leu
 35 40 45

Ser Glu Asn Met Lys Phe Gly Asp Glu Lys Gln Leu Ala Leu Met Lys
 50 55 60

Glu Lys Tyr Gly Trp Glu Val Gly Asp Lys Leu Pro Glu Trp Leu His
 65 70 75 80

Ser Ser Tyr His Arg Leu Leu Leu Ile Gly Glu Leu Leu Glu Ser Asn
 85 90 95

Leu Lys Leu Lys Lys Tyr Thr Val Glu Ile Thr Glu Thr Leu Ser Arg
 100 105 110

Leu Val Ser Ile Glu Ala Glu Asn Pro Asp Glu Ala Glu Arg Leu Val
 115 120 125

Arg Glu Lys Tyr Lys Ser Cys Glu Ile Val Leu Asp Ala Asp Asp Phe
 130 135 140

Gln Asp Tyr Asp Thr Ser Ile Tyr Glu
 145 150

<210> 716

<211> 336

<212> FRT

<213> Streptococcus pneumoniae

<400> 716

Met Ala Gly Lys Arg Asp Ser Cys Gly Ala Cys Arg Ile Met Thr Asn
 1 5 10 15

Lys Ile Tyr Glu Tyr Lys Asp Asp Gln Asp Trp Tyr Val Gly Ser Tyr
 20 25 30

Ser Ile Phe Gly Gly Val Asn Ser Leu Ser Asp Tyr Lys Thr Asp Phe
 35 40 45

Pro Leu Phe Glu Phe Ser Lys Ile Phe Gly Asp Glu Glu Tyr Gly Phe
 50 55 60

Pro Leu Ser Val Thr Val Leu Arg Tyr Gly Ser Ile Tyr Arg Leu Phe
 65 70 75 80

 Ser Phe Val Val Asp Met Leu Asn Gln Glu Met Gly Arg Asn Leu Glu
 85 90 95

 Val Ile Gln Arg His Gly Ala Leu Leu Val Glu Asn Gly Gln Leu
 100 105 110

 Leu Tyr Val Glu Leu Pro Lys Glu Gly Val Asn Val His Asp Phe Phe
 115 120 125

 Glu Thr Ser Lys Val Arg Glu Thr Leu Leu Ile Ala Thr Arg Asn Glu
 130 135 140

 Gly Lys Thr Lys Glu Phe Arg Ala Ile Phe Asp Lys Leu Gly Tyr Asp
 145 150 155 160

 Val Glu Asn Leu Asn Asp Tyr Pro Asp Leu Pro Glu Val Ala Glu Thr
 165 170 175

 Gly Met Thr Phe Glu Glu Asn Ala Arg Leu Lys Ala Glu Thr Ile Ser
 180 185 190

 Gln Leu Thr Gly Lys Met Val Leu Ala Asp Asp Ser Gly Leu Lys Val
 195 200 205

 Asp Val Leu Gly Gly Leu Pro Gly Val Trp Ser Ala Arg Phe Ala Gly
 210 215 220

 Val Gly Ala Thr Asp Arg Glu Asn Asn Ala Lys Leu Leu His Glu Leu
 225 230 235 240

 Ala Met Val Phe Glu Leu Lys Asp Arg Ser Ala Gln Phe His Thr Thr
 245 250 255

 Leu Val Val Ala Ser Pro Asn Lys Glu Ser Leu Val Val Glu Ala Asp
 260 265 270

 Trp Ser Gly Tyr Ile Asn Phe Glu Pro Lys Gly Glu Asn Gly Phe Gly
 275 280 285

Tyr Asp Pro Leu Phe Leu Val Gly Glu Thr Gly Glu Ser Ser Ala Glu
 290 295 300

Leu Thr Leu Glu Glu Lys Asn Ser Gln Ser His Arg Ala Leu Ala Val
 305 310 315 320

Lys Lys Leu Leu Glu Val Phe Pro Ser Trp Gln Ser Lys Pro Ser Leu
 325 330 335

<210> 717
 <211> 100
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 717

Met Ala Ser Leu Trp Tyr Asn Glu Arg Asp Ser Lys Arg Asn Arg Arg
 1 5 10 15

Lys Met Met Asp Leu Leu Leu Ala Ile Val Leu Ile Val Leu Ala Phe
 20 25 30

Leu Gly Gly Ala Leu Gly Gly Met Tyr Leu Val Arg Lys Gln Ile Glu
 35 40 45

Lys Glu Phe Ala Asp Asn Pro Arg Leu Asn Ala Glu Ala Val Arg Thr
 50 55 60

Leu Leu Ser Ala Asn Gly Gln Lys Pro Ser Glu Ala Lys Val Gln Gln
 65 70 75 80

Val Tyr His Gln Ile Ile Arg Gln Gln Lys Ala Ala Leu Ala Asn Asn
 85 90 95

Lys Lys Lys Lys
 100

<210> 718
 <211> 94
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 718

Met Leu Lys Pro Leu Gly Asp Arg Val Val Leu Lys Ile Glu Glu Lys
1 5 10 15

Glu Gln Thr Val Gly Gly Phe Val Leu Ala Gly Ser Ala Gln Glu Lys
20 25 30

Thr Lys Thr Ala Gln Val Val Ala Thr Gly Gln Gly Val Arg Thr Leu
35 40 45

Asn Gly Asp Leu Val Ala Pro Ser Val Lys Thr Gly Asp Arg Val Leu
50 55 60

Val Glu Ala His Ala Gly Leu Asp Val Lys Asp Gly Asp Glu Lys Tyr
65 70 75 80

Ile Ile Val Gly Glu Ala Asn Ile Leu Ala Ile Ile Glu Glu
85 90

<210> 719

<211> 158

<212> PRT

<213> Streptococcus pneumoniae

<400> 719

Met Lys Gly Val Thr Asn Met Thr Pro Glu Glu Met Tyr Leu Thr Glu
1 5 10 15

Arg Leu Asp Val Gln Ile Ala His Phe Leu Lys Lys Ser Val Gln His
20 25 30

Arg Arg Arg Tyr Lys Val Leu Lys Ile Thr Glu Ile Val Ala Gly Phe
35 40 45

Leu Ile Ala Val Phe Cys Ala Ile Pro Met Pro Gly Asp Arg Tyr Arg
50 55 60

Leu Ile Ser Val Ala Leu Ser Ser Leu Gly Leu Leu Cys Glu Gly Ile
65 70 75 80

Ile Asn Leu Tyr Asn Ala Lys Glu Asn Trp Ile Ser Tyr Gln Lys Thr
85 90 95

Ala Gln Leu Leu Glu Lys Glu Lys Phe Leu Tyr Gln Cys Gln Thr Glu
100 105 110

Lys Tyr Ala Gly Lys Thr Lys Ala Phe Ala Leu Phe Val Lys Thr Cys
115 120 125

Glu Gly Leu Ile Ser Glu Glu Ile Asn Gln Trp Glu Ser Ile Gln Ser
130 135 140

Lys Glu Val Ala Ala Ser Ala Asp Ala Pro Val Lys Lys Glu
145 150 155

<210> 720

<211> 388

<212> PRT

<213> Streptococcus pneumoniae

<400> 720

Met Ala Lys Lys Pro Lys Lys Leu Glu Glu Ile Ser Lys Lys Phe Gly
1 5 10 15

Ala Glu Arg Glu Lys Ala Leu Asn Asp Ala Leu Lys Leu Ile Glu Lys
20 25 30

Asp Phe Gly Lys Gly Ser Ile Met Arg Leu Gly Glu Arg Ala Glu Gln
35 40 45

Lys Val Gln Val Met Ser Ser Gly Ser Leu Ala Leu Asp Ile Ala Leu
50 55 60

Gly Ser Gly Gly Tyr Pro Lys Gly Arg Ile Ile Glu Ile Tyr Gly Pro
65 70 75 80

Glu Ser Ser Gly Lys Thr Thr Val Ala Leu His Ala Val Ala Gln Ala
85 90 95

Gln Lys Glu Gly Gly Ile Ala Ala Phe Ile Asp Ala Glu His Ala Leu
100 105 110

Asp Pro Ala Tyr Ala Ala Ala Leu Gly Val Asn Ile Asp Glu Leu Leu
115 120 125

Leu Ser Gln Pro Asp Ser Gly Glu Gln Gly Leu Glu Ile Ala Gly Lys
 130 135 140

Leu Ile Asp Ser Gly Ala Val Asp Leu Val Val Val Asp Ser Val Ala
 145 150 155 160

Ala Leu Val Pro Arg Ala Glu Ile Asp Gly Asp Ile Gly Asp Ser His
 165 170 175

Val Gly Leu Gln Ala Arg Met Met Ser Gln Ala Met Arg Lys Leu Gly
 180 185 190

Ala Ser Ile Asn Lys Thr Lys Thr Ile Ala Ile Phe Ile Asn Gln Leu
 195 200 205

Arg Glu Lys Val Gly Val Met Phe Gly Asn Pro Glu Thr Thr Pro Gly
 210 215 220

Gly Arg Ala Leu Lys Phe Tyr Ala Ser Val Arg Leu Asp Val Arg Gly
 225 230 235 240

Asn Thr Gln Ile Lys Gly Thr Gly Asp Gln Lys Glu Thr Asn Val Gly
 245 250 255

Lys Glu Thr Lys Ile Lys Val Val Lys Asn Lys Val Ala Pro Pro Phe
 260 265 270

Lys Glu Ala Val Val Glu Ile Met Tyr Gly Glu Gly Ile Ser Lys Thr
 275 280 285

Gly Glu Leu Leu Lys Ile Ala Ser Asp Leu Asp Ile Ile Lys Lys Ala
 290 295 300

Gly Ala Trp Tyr Ser Tyr Lys Asp Glu Lys Ile Gly Gln Gly Ser Glu
 305 310 315 320

Asn Ala Lys Lys Tyr Leu Ala Glu His Pro Glu Ile Phe Asp Glu Ile
 325 330 335

Asp Lys Gln Val Arg Ser Lys Phe Gly Leu Ile Asp Gly Glu Glu Val
 340 345 350

Ser Glu Gln Asp Thr Glu Asn Lys Lys Asp Glu Pro Lys Lys Glu Glu
 355 360 365

Ala Val Asn Glu Glu Val Pro Leu Asp Leu Gly Asp Glu Leu Glu Ile
 370 375 380

Glu Ile Glu Glu
 385

<210> 721
 <211> 1225
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 721

Met Val Asp Val Asn Arg Phe Lys Ser Met Gln Ile Thr Leu Ala Ser
 1 5 10 15

Pro Ser Lys Val Arg Ser Trp Ser Tyr Gly Glu Val Lys Lys Pro Glu
 20 25 30

Thr Ile Asn Tyr Arg Thr Leu Lys Pro Glu Arg Glu Gly Leu Phe Asp
 35 40 45

Glu Val Ile Phe Gly Pro Thr Lys Asp Trp Glu Cys Ala Cys Gly Lys
 50 55 60

Tyr Lys Arg Ile Arg Tyr Arg Gly Ile Val Cys Asp Arg Cys Gly Val
 65 70 75 80

Glu Val Thr Arg Thr Lys Val Arg Arg Glu Arg Met Gly His Ile Glu
 85 90 95

Leu Lys Ala Pro Val Ser His Ile Trp Tyr Phe Lys Gly Ile Pro Ser
 100 105 110

Arg Met Gly Leu Thr Leu Asp Met Ser Pro Arg Ala Leu Glu Glu Val
 115 120 125

Ile Tyr Phe Ala Ala Tyr Val Val Ile Asp Pro Lys Asp Thr Pro Leu
 130 135 140

Glu His Lys Ser Ile Met Thr Glu Arg Glu Tyr Arg Glu Arg Leu Arg
 145 150 155 160
 Glu Tyr Gly Tyr Gly Ser Phe Val Ala Lys Met Gly Ala Glu Ala Ile
 165 170 175
 Gln Asp Leu Leu Lys Gln Val Asp Leu Glu Lys Glu Ile Ala Glu Leu
 180 185 190
 Lys Glu Glu Leu Lys Thr Ala Thr Gly Gln Lys Arg Val Lys Ala Ile
 195 200 205
 Arg Arg Leu Asp Val Leu Asp Ala Phe Tyr Lys Ser Gly Asn Lys Pro
 210 215 220
 Glu Trp Met Ile Leu Asn Ile Leu Pro Val Ile Pro Pro Asp Leu Arg
 225 230 235 240
 Pro Met Leu Gln Leu Asp Gly Gly Arg Phe Ala Ser Ser Asp Leu Asn
 245 250 255
 Asp Leu Tyr Arg Arg Val Ile Asn Arg Asn Asn Arg Leu Ala Arg Leu
 260 265 270
 Leu Glu Leu Asn Ala Pro Gly Ile Ile Val Gln Asn Glu Lys Arg Met
 275 280 285
 Leu Gln Glu Ala Val Asp Ala Leu Ile Asp Asn Gly Arg Arg Gly Arg
 290 295 300
 Pro Ile Thr Gly Pro Gly Ser Arg Pro Leu Lys Ser Leu Ser His Met
 305 310 315 320
 Leu Lys Gly Lys Gln Gly Arg Phe Arg Gln Asn Leu Leu Gly Lys Arg
 325 330 335
 Val Asp Phe Ser Gly Arg Ser Val Ile Ala Val Gly Pro Thr Leu Lys
 340 345 350
 Met Tyr Gln Cys Gly Val Pro Arg Glu Met Ala Ile Glu Leu Phe Lys

355	360	365
Pro Phe Val Met Arg Glu Ile Val Ala Arg Asp Ile Val Gln Asn Val		
370	375	380
Lys Ala Ala Lys Arg Leu Val Glu Arg Gly Asp Glu Arg Ile Trp Asp		
385	390	400
Ile Leu Glu Glu Val Ile Lys Glu His Pro Val Leu Leu Asn Arg Ala		
405	410	415
Pro Thr Leu His Arg Leu Gly Ile Gln Ala Phe Glu Pro Val Leu Ile		
420	425	430
Asp Gly Lys Ala Leu Arg Leu His Pro Leu Val Cys Glu Ala Tyr Asn		
435	440	445
Ala Asp Phe Asp Gly Asp Gln Met Ala Ile His Val Pro Leu Ser Glu		
450	455	460
Glu Ala Gln Ala Glu Ala Arg Ile Leu Met Leu Ala Ala Glu His Ile		
465	470	475
Leu Asn Pro Lys Asp Gly Lys Pro Val Val Thr Pro Ser Gln Asp Met		
485	490	495
Val Leu Gly Asn Tyr Tyr Leu Thr Met Glu Glu Ala Gly Arg Glu Gly		
500	505	510
Glu Gly Met Val Phe Lys Asp Arg Asp Glu Ala Val Met Ala Tyr Arg		
515	520	525
Asn Gly Tyr Val His Leu His Ser Arg Val Gly Ile Ala Thr Asp Ser		
530	535	540
Leu Asn Lys Pro Trp Thr Glu Glu Gln Arg His Lys Val Leu Leu Thr		
545	550	555
Thr Val Gly Lys Ile Leu Phe Asn Asp Ile Met Pro Glu Gly Leu Pro		
565	570	575

Tyr Leu Gln Glu Pro Asn Asn Ala Asn Leu Thr Glu Gly Val Pro Ala
 580 585 590
 Lys Tyr Phe Leu Pro Leu Gly Gly Asp Ile Lys Glu Ala Ile Ser Asn
 595 600 605
 Leu Glu Leu Asn Pro Pro Phe Lys Lys Lys Asn Leu Gly Asn Ile Ile
 610 615 620
 Ala Glu Ile Phe Lys Arg Phe Arg Thr Thr Glu Thr Ser Ala Leu Leu
 625 630 635 640
 Asp Arg Met Lys Asn Leu Gly Tyr His His Ser Thr Leu Ala Gly Leu
 645 650 655
 Thr Val Gly Ile Ala Asp Ile Pro Val Val Asp Asp Lys Ala Glu Ile
 660 665 670
 Ile Glu Glu Ser His Lys Arg Val Glu Gln Ile Thr Lys Gln Phe Arg
 675 680 685
 Arg Gly Met Ile Thr Asp Asp Glu Arg Tyr Asn Ala Val Thr Ala Glu
 690 695 700
 Trp Arg Ala Ala Arg Glu Lys Leu Glu Lys Arg Leu Ile Ala Asn Gln
 705 710 715 720
 Asp Pro Lys Asn Pro Ile Val Met Met Met Asp Ser Gly Ala Arg Gly
 725 730 735
 Asn Ile Ser Asn Phe Ser Gln Leu Ala Gly Met Arg Gly Leu Met Ala
 740 745 750
 Ala Pro Asn Gly Arg Ile Met Glu Leu Pro Ile Leu Ser Asn Phe Arg
 755 760 765
 Glu Gly Leu Ser Val Leu Glu Met Phe Phe Ser Thr His Gly Ala Arg
 770 775 780
 Lys Gly Met Thr Asp Thr Ala Leu Lys Thr Ala Asp Ser Gly Tyr Leu
 785 790 795 800

Thr Arg Arg Leu Val Asp Val Ala Gln Asp Val Ile Ile Arg Glu Asp
 805 810 815

Asp Cys Gly Thr Asp Arg Gly Leu Leu Ile Arg Ser Ile Ala Glu Gly
 820 825 830

Lys Glu Met Ile Glu Ser Leu Glu Glu Arg Leu Asn Gly Arg Tyr Thr
 835 840 845

Lys Lys Thr Val Lys His Pro Glu Thr Gly Ala Val Ile Ile Gly Pro
 850 855 860

Asn Glu Leu Ile Thr Glu Asp Lys Ala Arg Glu Ile Val Asn Ala Gly
 865 870 875 880

Val Glu Glu Val Thr Ile Arg Ser Val Phe Thr Cys Asn Thr Arg His
 885 890 895

Gly Val Cys Arg His Cys Tyr Gly Ile Asn Leu Ala Thr Gly Asp Ala
 900 905 910

Val Glu Val Gly Glu Ala Val Gly Thr Ile Ala Ala Gln Ser Ile Gly
 915 920 925

Glu Pro Gly Thr Gln Leu Thr Met Arg Thr Phe His Thr Gly Gly Val
 930 935 940

Ala Ser Asn Thr Asp Ile Thr Gln Gly Leu Pro Arg Val Gln Glu Ile
 945 950 955 960

Phe Glu Ala Arg Asn Pro Lys Gly Glu Ala Val Ile Thr Glu Val Lys
 965 970 975

Gly Gln Val Thr Ala Ile Glu Glu Asp Ala Ser Thr Arg Thr Lys Lys
 980 985 990

Val Phe Val Lys Gly Glu Thr Gly Glu Gly Glu Tyr Val Val Pro Phe
 995 1000 1005

Thr Ala Arg Met Arg Val Glu Val Gly Gly Gln Val Ala Arg Gly
 1010 1015 1020

Ala Ala Leu Thr Glu Gly Ser Ile Gln Pro Lys Arg Leu Leu Ala
 1025 1030 1035
 Val Arg Asp Val Leu Ser Val Glu Thr Tyr Leu Leu Gly Glu Val
 1040 1045 1050
 Gln Lys Val Tyr Arg Ser Gln Gly Val Glu Ile Gly Asp Lys His
 1055 1060 1065
 Ile Glu Val Met Val Arg Gln Met Ile Arg Lys Val Arg Val Met
 1070 1075 1080
 Asp Pro Gly Asp Thr Asp Leu Leu Met Gly Thr Leu Met Asp Ile
 1085 1090 1095
 Asn Asp Phe Thr Asp Ala Asn Lys Asp Val Leu Ile Ala Gly Gly
 1100 1105 1110
 Val Pro Ala Thr Gly Arg Pro Val Leu Met Gly Ile Thr Lys Ala
 1115 1120 1125
 Ser Leu Glu Thr Asn Ser Phe Leu Ser Ala Ala Ser Phe Gln Glu
 1130 1135 1140
 Thr Thr Arg Val Leu Thr Asp Ala Ala Ile Arg Gly Lys Lys Asp
 1145 1150 1155
 His Leu Leu Gly Leu Lys Glu Asn Val Ile Ile Gly Lys Ile Ile
 1160 1165 1170
 Pro Ala Gly Thr Gly Met Ala Arg Tyr Arg Asn Leu Glu Pro His
 1175 1180 1185
 Ala Val Asn Glu Glu Glu Tyr Leu Asn Pro Pro Val Glu Glu Glu
 1190 1195 1200
 Gly Asn Glu Glu Thr Thr Glu Val Val Val Asp Thr Ala Val Glu
 1205 1210 1215
 Thr Val Glu Glu Thr Val Glu

1220

1225

<210> 722
 <211> 332
 <212> PRT
 <213> *Streptococcus pneumoniae*

<400> 722

Met Ser Met Lys Lys Ser Phe Ile His Gln Gln Glu Glu Ile Ser Phe
 1 5 10 15

Val Lys Asn Thr Phe Thr Gln Tyr Leu Lys Asp Lys Leu Glu Val Val
 20 25 30

Glu Val Gln Gly Pro Ile Leu Ser Lys Val Gly Asp Gly Met Gln Asp
 35 40 45

Asn Leu Ser Gly Val Glu Asn Pro Val Ser Val Lys Val Leu Gln Ile
 50 55 60

Pro Asp Ala Thr Tyr Glu Val Val His Ser Leu Ala Lys Trp Lys Arg
 65 70 75 80

His Thr Leu Ala Arg Phe Gly Phe Gly Glu Gly Glu Gly Leu Phe Val
 85 90 95

His Met Lys Ala Leu Arg Pro Asp Glu Asp Ser Leu Asp Ala Thr His
 100 105 110

Ser Val Tyr Val Asp Gln Trp Asp Trp Glu Lys Val Ile Pro Asn Gly
 115 120 125

Lys Arg Asn Ile Val Tyr Leu Lys Glu Thr Val Glu Lys Ile Tyr Lys
 130 135 140

Ala Ile Arg Leu Thr Glu Leu Ala Val Glu Ala Arg Tyr Asp Ile Glu
 145 150 155 160

Ser Ile Leu Pro Lys Gln Ile Thr Phe Ile His Thr Glu Glu Leu Val
 165 170 175

Glu Arg Tyr Pro Asp Leu Thr Pro Lys Glu Arg Glu Asn Ala Ile Cys

	180		185		190										
Lys	Glu	Phe	Gly	Ala	Val	Phe	Leu	Ile	Gly	Ile	Gly	Gly	Glu	Leu	Pro
		195					200					205			
Asp	Gly	Lys	Pro	His	Asp	Gly	Arg	Ala	Pro	Asp	Tyr	Asp	Asp	Trp	Thr
	210					215					220				
Ser	Glu	Ser	Glu	Asn	Gly	Tyr	Lys	Gly	Leu	Asn	Gly	Asp	Ile	Leu	Val
225				230					235					240	
Trp	Asn	Glu	Ser	Leu	Gly	Gly	Ala	Phe	Glu	Leu	Ser	Ser	Met	Gly	Ile
				245					250					255	
Arg	Val	Asp	Glu	Glu	Thr	Leu	Arg	Arg	Gln	Val	Glu	Ile	Thr	Gly	Asp
			260					265					270		
Glu	Asp	Arg	Leu	Glu	Leu	Glu	Trp	His	Lys	Ser	Leu	Leu	Asn	Gly	Leu
		275					280						285		
Phe	Pro	Leu	Thr	Ile	Gly	Gly	Gly	Ile	Gly	Gln	Ser	Arg	Met	Ala	Met
	290				295						300				
Phe	Leu	Leu	Arg	Lys	Arg	His	Ile	Gly	Glu	Val	Gln	Thr	Ser	Val	Trp
305				310					315					320	
Pro	Gln	Glu	Val	Arg	Asp	Thr	Tyr	Glu	Asn	Ile	Leu				
				325				330							

<210> 723
 <211> 275
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 723

Met	Lys	Leu	Arg	Arg	Ser	Asp	Arg	Met	Val	Val	Ile	Ser	Asn	Tyr	Leu
1				5				10					15		
Ile	Asn	Asn	Pro	Tyr	Lys	Leu	Thr	Ser	Leu	Asn	Thr	Phe	Ala	Glu	Lys
			20				25					30			
Tyr	Glu	Ser	Ala	Lys	Ser	Ser	Ile	Ser	Glu	Asp	Ile	Val	Ile	Ile	Lys

35	40	45
Arg Ala Phe Glu Glu Ile	Glu Ile Gly His Ile	Gln Thr Val Thr Gly
50	55	60
Ala Gly Gly Gly Val Ile	Phe Thr Pro Ser Ile	Ser Ser Gln Asp Ala
65	70	75
Lys Glu Met Val Glu Asp	Leu Arg Thr Lys	Leu Ser Glu Ser Asp Arg
85	90	95
Ile Leu Pro Gly Gly Tyr	Ile Tyr Leu Ser Asp	Leu Leu Ser Thr Pro
100	105	110
Ala Ile Leu Lys Asn Ile	Gly Arg Ile Ile Ala	Lys Ser Phe Met Asp
115	120	125
Gln Lys Ile Asp Ala Val	Met Thr Val Ala Thr	Lys Gly Val Pro Leu
130	135	140
Ala Asn Ala Val Ala Asn	Val Leu Asn Val Ser	Phe Val Ile Val Arg
145	150	155
Arg Asp Leu Lys Ile Thr	Glu Gly Ser Thr Val	Ser Val Asn Tyr Val
165	170	175
Ser Gly Ser Ser Gly Asp	Arg Ile Glu Lys Met	Phe Leu Ser Lys Arg
180	185	190
Ser Leu Lys Ala Gly Ser	Arg Val Leu Ile Val	Asp Asp Phe Leu Lys
195	200	205
Gly Gly Gly Thr Val Asn	Gly Met Ile Ser Leu	Leu Arg Glu Phe Asp
210	215	220
Ser Glu Leu Ala Gly Val	Ala Val Phe Ala Asp	Asn Ala Gln Glu Glu
225	230	235
Arg Glu Lys Gln Phe Asp	Tyr Lys Ser Leu Leu	Lys Val Thr Asn Ile
245	250	255

Asp Val Lys Asn Gln Ala Ile Asp Val Glu Val Gly Asn Ile Phe Asp
 260 265 270

Glu Asp Lys
 275

<210> 724
 <211> 404
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 724

Met Lys Glu Tyr Asn Lys Ser Ser Lys Leu Glu His Val Ala Tyr Asp
 1 5 10 15

Ile Arg Gly Pro Val Leu Glu Glu Ala Met Arg Met Arg Ala Asn Gly
 20 25 30

Glu Lys Ile Leu Arg Leu Asn Thr Gly Asn Pro Ala Glu Phe Gly Phe
 35 40 45

Thr Ala Pro Asp Glu Val Ile His Asp Leu Ile Met Asn Ala Arg Asp
 50 55 60

Ser Glu Gly Tyr Ser Asp Ser Lys Gly Ile Phe Ser Ala Arg Lys Ala
 65 70 75 80

Ile Met Gln Tyr Cys Gln Leu Lys Lys Phe Pro Asn Val Asp Thr Asp
 85 90 95

Asp Ile Tyr Leu Gly Asn Gly Val Ser Glu Leu Ile Val Met Ser Met
 100 105 110

Gln Gly Leu Leu Asp Asn Gly Asp Glu Val Leu Val Pro Met Pro Asp
 115 120 125

Tyr Pro Leu Trp Thr Ala Ala Val Ser Leu Ala Gly Gly Asn Ala Val
 130 135 140

His Tyr Ile Cys Asp Glu Ala Val Glu Trp Tyr Pro Asp Ile Asp Asp
 145 150 155 160

Ile Lys Ser Lys Ile Thr Ser Asn Thr Lys Ala Ile Val Leu Ile Asn
 165 170 175

Pro Asn Asn Pro Thr Gly Ala Leu Tyr Pro Lys Glu Leu Leu Leu Glu
 180 185 190

Ile Ile Glu Ile Ala Arg Gln Asn Asp Leu Ile Ile Phe Ala Asp Glu
 195 200 205

Ile Tyr Asp Arg Met Val Met Asp Gly His Val His Thr Pro Val Ala
 210 215 220

Ser Leu Ala Pro Asp Val Phe Cys Val Ser Met Asn Gly Leu Ser Lys
 225 230 235 240

Ser His Arg Ile Ala Gly Phe Arg Val Gly Trp Met Val Leu Ser Gly
 245 250 255

Pro Lys Thr His Val Lys Gly Tyr Ile Glu Gly Leu Asn Met Leu Ser
 260 265 270

Asn Met Arg Leu Cys Ser Asn Val Leu Ala Gln Gln Val Val Gln Thr
 275 280 285

Ser Leu Gly Gly His Gln Ser Val Asp Glu Leu Leu Leu Pro Gly Gly
 290 295 300

Arg Ile Tyr Glu Gln Arg Asn Phe Ile Tyr Asn Ala Ile Gln Asp Ile
 305 310 315 320

Pro Gly Leu Ser Ala Val Lys Pro Lys Ala Gly Leu Tyr Ile Phe Pro
 325 330 335

Lys Ile Asp Arg Asn Met Tyr Arg Ile Asp Asp Asp Glu Gln Phe Val
 340 345 350

Leu Asp Phe Leu Lys Gln Glu Lys Val Leu Leu Val His Gly Arg Gly
 355 360 365

Phe Asn Trp Gln Glu Pro Asp His Phe Arg Ile Val Tyr Leu Pro Arg
 370 375 380

Val Asp Glu Leu Ala Gln Ile Gln Glu Lys Met Thr Arg Phe Leu Lys
 385 390 395 400

Gln Tyr Arg Arg

<210> 725

<211> 171

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 725

Met Leu Tyr Phe Tyr Ser Glu Lys Val Tyr Asn Tyr Ser Lys Lys Ile
 1 5 10 15

Ser Gly Gly Phe Ile Met Ala Gln Arg Tyr Gln Asn Ile Met Val Ala
 20 25 30

Ile Asp Gly Ser Lys Glu Ala Asp Leu Ala Phe Val Lys Gly Val His
 35 40 45

Ser Ala Leu Arg Asn Asp Ala Lys Leu Thr Ile Ala His Val Ile Asp
 50 55 60

Thr Arg Ala Leu Gln Ser Val Ser Thr Phe Asp Ala Glu Val Tyr Glu
 65 70 75 80

Glu Leu Gln Val Asp Ala Glu Ser Leu Met Lys Glu Tyr Glu Lys Arg
 85 90 95

Ala Lys Asp Ala Gly Val Ala Asp Val His Ile Val Ile Glu Met Gly
 100 105 110

Asn Pro Lys Thr Leu Leu Ala Arg Thr Ile Pro Asp Ala Glu Glu Val
 115 120 125

Asp Leu Ile Leu Val Gly Ala Thr Gly Leu Asn Ala Phe Glu Arg Leu
 130 135 140

Leu Val Gly Ser Ser Ser Glu Tyr Ile Leu Arg His Ala Lys Val Asp
 145 150 155 160

Leu Leu Val Val Arg Glu Gln Glu Lys Thr Leu
 165 170

<210> 726
 <211> 346
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 726

Met Cys Glu Ile Glu Arg Thr Gly Lys Gly Met Asn Ala Asp Asp Thr
 1 5 10 15

Val Thr Ile Tyr Asp Val Ala Arg Glu Ala Gly Val Ser Met Ala Thr
 20 25 30

Val Ser Arg Val Val Asn Gly Asn Lys Asn Val Lys Glu Asn Thr Arg
 35 40 45

Lys Lys Val Leu Glu Val Ile Asp Arg Leu Asp Tyr Arg Pro Asn Ala
 50 55 60

Val Ala Arg Gly Leu Ala Ser Lys Lys Thr Thr Thr Val Gly Val Val
 65 70 75 80

Ile Pro Asn Ile Thr Asn Gly Tyr Phe Ser Ser Leu Ala Lys Gly Ile
 85 90 95

Asp Asp Ile Ala Glu Met Tyr Lys Tyr Asn Ile Val Leu Ala Asn Ser
 100 105 110

Asp Glu Asp Asn Glu Lys Glu Val Ser Val Val Asn Thr Leu Phe Ser
 115 120 125

Lys Gln Val Asp Gly Ile Ile Tyr Met Gly Tyr His Leu Thr Asp Lys
 130 135 140

Ile Arg Ser Glu Phe Ser Arg Ser Arg Thr Pro Ile Val Leu Ala Gly
 145 150 155 160

Thr Val Asp Val Glu His Gln Leu Pro Ser Val Asn Ile Asp Tyr Lys
 165 170 175

Gln Ala Thr Ile Asp Ala Val Ser Tyr Leu Ala Lys Glu Asn Glu Arg
180 185 190

Ile Ala Phe Val Ser Gly Pro Leu Val Asp Asp Ile Asn Gly Lys Val
195 200 205

Arg Leu Val Gly Tyr Lys Glu Thr Leu Lys Lys Ala Gly Ile Thr Tyr
210 215 220

Ser Glu Gly Leu Val Phe Glu Ser Lys Tyr Ser Tyr Asp Asp Gly Tyr
225 230 235 240

Ala Leu Ala Glu Arg Leu Ile Ser Ser Asn Ala Thr Ala Ala Val Val
245 250 255

Thr Gly Asp Glu Leu Ala Ala Gly Val Leu Asn Gly Leu Ala Asp Lys
260 265 270

Gly Val Ser Val Pro Glu Asp Phe Glu Ile Ile Thr Ser Asp Asp Ser
275 280 285

Gln Ile Ser Arg Phe Thr Arg Pro Asn Leu Thr Thr Ile Ala Gln Pro
290 295 300

Leu Tyr Asp Leu Gly Ala Ile Ser Met Arg Met Leu Thr Lys Ile Met
305 310 315 320

His Lys Glu Glu Leu Glu Glu Arg Glu Val Leu Leu Pro His Gly Leu
325 330 335

Thr Glu Arg Ser Ser Thr Arg Lys Arg Lys
340 345

<210> 727

<211> 183

<212> PRT

<213> Streptococcus pneumoniae

<400> 727

Met Lys Gly Asn Ile Met Asp Ser Phe Asp Lys Gly Trp Phe Val Leu
1 5 10 15

Gln Thr Tyr Ser Gly Tyr Glu Asn Lys Val Lys Glu Asn Leu Leu Gln
 20 25 30

Arg Ala Gln Thr Tyr Asn Met Leu Asp Asn Ile Leu Arg Val Glu Ile
 35 40 45

Pro Thr Gln Thr Val Gln Val Glu Lys Asn Gly Lys Arg Lys Glu Val
 50 55 60

Glu Glu Asn Arg Phe Pro Gly Tyr Val Leu Val Glu Met Val Met Thr
 65 70 75 80

Asp Glu Ala Trp Phe Val Val Arg Asn Thr Pro Asn Val Thr Gly Phe
 85 90 95

Val Gly Ser His Gly Asn Arg Ser Lys Pro Thr Pro Leu Leu Glu Gln
 100 105 110

Glu Ile Arg Asp Ile Leu Val Ser Met Gly Gln Thr Val Gln Glu Phe
 115 120 125

Asp Phe Asp Val Glu Ile Gly Gln Thr Val Arg Ile Ile Asp Gly Ala
 130 135 140

Phe Ala Asp Tyr Thr Gly Lys Ile Thr Glu Ile Asp Asn Asn Lys Val
 145 150 155 160

Lys Met Ile Ile Ser Met Phe Gly Asn Asp Thr Val Ala Glu Val Asn
 165 170 175

Leu Asn Gln Ile Ala Glu Leu
 180

<210> 728

<211> 731

<212> PRT

<213> Streptococcus pneumoniae

<400> 728

Met Lys Leu Asp Lys Leu Phe Glu Lys Phe Leu Ser Leu Phe Lys Lys
 1 5 10 15

Glu Thr Ser Glu Leu Glu Asp Ser Asp Ser Thr Ile Leu Arg Arg Ser
 20 25 30

Arg Ser Asp Arg Lys Lys Leu Ala Gln Val Gly Pro Ile Arg Lys Phe
 35 40 45

Trp Arg Arg Tyr His Leu Thr Lys Ile Ile Leu Ile Leu Gly Leu Ser
 50 55 60

Ala Gly Leu Leu Val Gly Ile Tyr Leu Phe Ala Val Ala Lys Ser Thr
 65 70 75 80

Asn Val Asn Asp Leu Gln Asn Ala Leu Lys Thr Arg Thr Leu Ile Phe
 85 90 95

Asp Arg Glu Glu Lys Glu Ala Gly Ala Leu Ser Gly Gln Lys Gly Thr
 100 105 110

Tyr Val Glu Leu Thr Asp Ile Ser Lys Asn Leu Gln Asn Ala Val Ile
 115 120 125

Ala Thr Glu Asp Arg Ser Phe Tyr Lys Asn Asp Gly Ile Asn Tyr Gly
 130 135 140

Arg Phe Phe Leu Ala Ile Val Thr Ala Gly Arg Ser Gly Gly Gly Ser
 145 150 155 160

Thr Ile Thr Gln Gln Leu Ala Lys Asn Ala Tyr Leu Ser Gln Asp Gln
 165 170 175

Thr Val Glu Arg Lys Ala Lys Glu Phe Phe Leu Ala Leu Glu Leu Ser
 180 185 190

Lys Lys Tyr Ser Lys Glu Gln Ile Leu Thr Met Tyr Leu Asn Asn Ala
 195 200 205

Tyr Phe Gly Asn Gly Val Trp Gly Val Glu Asp Ala Ser Lys Lys Tyr
 210 215 220

Phe Gly Val Ser Ala Ser Glu Val Ser Leu Asp Gln Ala Ala Thr Leu
 225 230 235 240

Ala Gly Met Leu Lys Gly Pro Glu Leu Tyr Asn Pro Leu Asn Ser Val
245 250 255

Glu Asp Ser Thr Asn Arg Arg Asp Thr Val Leu Gln Asn Met Val Ala
260 265 270

Ala Gly Tyr Ile Asp Lys Asn Gln Glu Thr Lys Ala Ala Glu Val Asp
275 280 285

Met Thr Ser Gln Leu His Asp Lys Tyr Glu Gly Lys Ile Ser Asp Tyr
290 295 300

Arg Tyr Pro Ser Tyr Phe Asp Ala Val Val Asn Glu Ala Val Ser Lys
305 310 315 320

Tyr Asn Leu Thr Glu Glu Glu Ile Val Asn Asn Gly Tyr Arg Ile Tyr
325 330 335

Thr Glu Leu Asp Gln Asn Tyr Gln Ala Asn Met Gln Ile Val Tyr Glu
340 345 350

Asn Thr Ser Leu Phe Pro Arg Ala Glu Asp Gly Thr Phe Ala Gln Ser
355 360 365

Gly Ser Val Ala Leu Glu Pro Lys Thr Gly Gly Val Arg Gly Val Val
370 375 380

Gly Gln Val Ala Asp Asn Asp Lys Thr Gly Phe Arg Asn Phe Asn Tyr
385 390 395 400

Ala Thr Gln Ser Lys Arg Ser Pro Gly Ser Thr Ile Lys Pro Leu Val
405 410 415

Val Tyr Thr Pro Ala Val Glu Ala Ser Trp Ala Leu Asn Lys Gln Leu
420 425 430

Asp Asn His Thr Met Gln Tyr Asp Ser Tyr Lys Val Asp Asn Tyr Ala
435 440 445

Gly Ile Lys Thr Ser Arg Glu Val Pro Met Tyr Gln Ala Leu Ala Glu

450	455	460
Ser Leu Asn Leu Pro Ala Val Ala Thr Val Asn Asp Leu Gly Val Asp		
465	470	475 480
Lys Ala Phe Glu Ala Gly Glu Lys Phe Gly Leu Asn Met Glu Lys Val		
	485	490 495
Asp Arg Val Leu Gly Val Ala Leu Gly Ser Gly Val Glu Thr Asn Pro		
	500	505 510
Leu Gln Met Ala Gln Ala Tyr Ala Ala Phe Ala Asn Glu Gly Leu Met		
	515	520 525
Pro Glu Ala His Phe Ile Ser Arg Ile Glu Asn Ala Ser Gly Gln Val		
	530	535 540
Ile Ala Ser His Lys Asn Ser Gln Lys Arg Val Ile Asp Lys Ser Val		
	545	550 555 560
Ala Asp Lys Met Thr Ser Met Met Leu Gly Thr Phe Thr Asn Gly Thr		
	565	570 575
Gly Ile Ser Ser Ser Pro Ala Asp Tyr Val Met Ala Gly Lys Thr Gly		
	580	585 590
Thr Thr Glu Ala Val Phe Asn Pro Glu Tyr Thr Ser Asp Gln Trp Val		
	595	600 605
Ile Gly Tyr Thr Pro Asp Val Val Ile Ser His Trp Leu Gly Phe Pro		
	610	615 620
Thr Thr Asp Glu Asn His Tyr Leu Ala Gly Ser Thr Ser Asn Gly Ala		
	625	630 635 640
Ala His Val Phe Arg Asn Ile Ala Asn Thr Ile Leu Pro Tyr Thr Pro		
	645	650 655
Gly Ser Thr Phe Thr Val Glu Asn Ala Tyr Lys Gln Asn Gly Ile Ala		
	660	665 670

Pro Ala Asn Thr Lys Arg Gln Val Gln Thr Asn Asp Asn Ser Gln Thr
 675 680 685

Asp Asp Asn Leu Ser Asp Ile Arg Gly Arg Ala Gln Ser Leu Val Asp
 690 695 700

Glu Ala Ser Arg Ala Ile Ser Asp Ala Lys Ile Lys Glu Lys Ala Gln
 705 710 715 720

Thr Ile Trp Asp Ser Ile Val Asn Leu Phe Arg
 725 730

<210> 729

<211> 396

<212> PRT

<213> Streptococcus pneumoniae

<400> 729

Met Thr Lys Thr Ile Ala Ile Asn Ala Gly Ser Ser Ser Leu Lys Trp
 1 5 10 15

Gln Leu Tyr Leu Met Pro Glu Glu Lys Val Leu Ala Lys Gly Leu Ile
 20 25 30

Glu Arg Ile Gly Leu Lys Asp Ser Ile Ser Thr Val Lys Phe Asp Gly
 35 40 45

Arg Ser Glu Gln Gln Ile Leu Asp Ile Glu Asn His Ile Gln Ala Val
 50 55 60

Lys Ile Leu Leu Asp Asp Leu Ile Arg Phe Asp Ile Ile Lys Ala Tyr
 65 70 75 80

Asp Glu Ile Thr Gly Val Gly His Arg Val Val Ala Gly Gly Glu Tyr
 85 90 95

Phe Lys Glu Ser Thr Val Val Glu Gly Asp Val Leu Glu Lys Val Glu
 100 105 110

Glu Leu Ser Leu Leu Ala Pro Leu His Asn Pro Ala Asn Ala Ala Gly
 115 120 125

Val Arg Ala Phe Lys Glu Leu Leu Pro Asp Ile Thr Ser Val Val Val
 130 135 140
 Phe Asp Thr Ser Phe His Thr Ser Met Pro Glu Lys Ala Tyr Arg Tyr
 145 150 155 160
 Pro Leu Pro Thr Lys Tyr Tyr Thr Glu Asn Lys Val Arg Lys Tyr Gly
 165 170 175
 Ala His Gly Thr Ser His Gln Phe Val Ala Gly Glu Ala Ala Lys Leu
 180 185 190
 Leu Gly Arg Pro Leu Glu Asp Leu Lys Leu Ile Thr Cys His Ile Gly
 195 200 205
 Asn Gly Gly Ser Ile Thr Ala Val Lys Ala Gly Lys Ser Val Asp Thr
 210 215 220
 Ser Met Gly Phe Thr Pro Leu Gly Gly Ile Met Met Gly Thr Arg Thr
 225 230 235 240
 Gly Asp Ile Asp Pro Ala Ile Ile Pro Tyr Leu Met Gln Tyr Thr Glu
 245 250 255
 Asp Phe Asn Thr Pro Glu Asp Ile Ser Arg Val Leu Asn Arg Glu Ser
 260 265 270
 Gly Leu Leu Gly Val Ser Ala Asn Ser Ser Asp Met Arg Asp Ile Glu
 275 280 285
 Ala Ala Val Ala Glu Gly Asn His Glu Ala Ser Leu Ala Tyr Glu Met
 290 295 300
 Tyr Val Asp Arg Ile Gln Lys His Ile Gly Gln Tyr Leu Ala Val Leu
 305 310 315 320
 Asn Gly Ala Asp Ala Ile Val Phe Thr Ala Gly Val Gly Glu Asn Ala
 325 330 335
 Glu Ser Phe Arg Arg Asp Val Ile Ser Gly Ile Ser Trp Phe Gly Cys
 340 345 350

Asp Val Asp Asp Glu Lys Asn Val Phe Gly Val Thr Gly Asp Ile Ser
 355 360 365

Thr Glu Ala Ala Lys Ile Arg Val Leu Val Ile Pro Thr Asp Glu Glu
 370 375 380

Leu Val Ile Ala Arg Asp Val Glu Arg Leu Lys Lys
 385 390 395

<210> 730

<211> 352

<212> PRT

<213> Streptococcus pneumoniae

<400> 730

Met Lys Ala Tyr Thr Tyr Val Lys Pro Gly Leu Ala Ser Phe Val Asp
 1 5 10 15

Val Asp Lys Pro Val Ile Arg Lys Pro Thr Asp Ala Ile Val Arg Ile
 20 25 30

Val Lys Thr Thr Ile Cys Gly Thr Asp Leu His Ile Ile Lys Gly Asp
 35 40 45

Val Pro Thr Cys Gln Ser Gly Thr Ile Leu Gly His Glu Gly Ile Gly
 50 55 60

Ile Val Glu Glu Val Gly Glu Gly Val Ser Asn Phe Lys Lys Gly Asp
 65 70 75 80

Lys Val Leu Ile Ser Cys Val Cys Ala Cys Gly Lys Cys Tyr Tyr Cys
 85 90 95

Lys Lys Gly Ile Tyr Ala His Cys Glu Asp Glu Gly Gly Trp Ile Phe
 100 105 110

Gly His Leu Ile Asp Gly Met Gln Ala Glu Tyr Leu Arg Val Pro His
 115 120 125

Ala Asp Asn Thr Leu Tyr His Thr Pro Glu Asp Leu Ser Asp Glu Ala
 130 135 140

Leu Val Met Leu Ser Asp Ile Leu Pro Thr Gly Tyr Glu Ile Gly Val
 145 150 155 160

Leu Lys Gly Lys Val Glu Pro Gly Cys Ser Val Ala Ile Ile Gly Ser
 165 170 175

Gly Pro Val Gly Leu Ala Ala Leu Leu Thr Ala Gln Phe Tyr Ser Pro
 180 185 190

Ala Lys Leu Ile Met Val Asp Leu Asp Asp Asn Arg Leu Glu Thr Ala
 195 200 205

Leu Ser Phe Gly Ala Thr His Lys Val Asn Ser Ser Asp Pro Glu Lys
 210 215 220

Ala Ile Lys Glu Ile Tyr Asp Leu Thr Asp Gly Arg Gly Val Asp Val
 225 230 235 240

Ala Ile Glu Ala Val Gly Ile Pro Ala Thr Phe Asp Phe Cys Gln Lys
 245 250 255

Ile Ile Gly Val Asp Gly Thr Val Ala Asn Cys Gly Val His Gly Lys
 260 265 270

Pro Val Glu Phe Asp Leu Asp Lys Leu Trp Ile Arg Asn Ile Asn Val
 275 280 285

Thr Thr Gly Leu Val Ser Thr Asn Thr Thr Pro Gln Leu Leu Lys Ala
 290 295 300

Leu Glu Ser His Lys Ile Glu Pro Glu Lys Leu Val Thr His Tyr Phe
 305 310 315 320

Lys Leu Ser Glu Ile Glu Lys Ala Tyr Glu Val Phe Ser Lys Ala Ala
 325 330 335

Asp His His Ala Ile Lys Val Ile Ile Glu Asn Asp Ile Ser Glu Ala
 340 345 350

<210> 731

<211> 564

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 731

Met Leu Ile Gln Lys Ile Lys Thr Tyr Lys Trp Gln Ala Leu Ala Ser
 1 5 10 15

Leu Leu Met Thr Gly Leu Met Val Ala Ser Ser Leu Leu Gln Pro Arg
 20 25 30

Tyr Leu Gln Glu Val Leu Gly Ala Leu Leu Thr Gly Lys Tyr Glu Ala
 35 40 45

Ile Tyr Ser Ile Gly Ala Trp Leu Ile Gly Val Ala Val Val Gly Leu
 50 55 60

Val Ala Gly Gly Leu Asn Val Val Leu Ala Ala Tyr Ile Ala Gln Gly
 65 70 75 80

Val Ser Ser Asp Leu Arg Glu Asp Ala Phe Arg Lys Ile Gln Thr Phe
 85 90 95

Ser Tyr Ala Asp Ile Glu Gln Phe Asn Ala Gly Asn Leu Val Val Arg
 100 105 110

Met Thr Asn Asp Ile Asn Gln Ile Gln Asn Val Val Met Met Thr Phe
 115 120 125

Gln Ile Leu Phe Arg Leu Pro Leu Leu Phe Ile Gly Ser Phe Ile Leu
 130 135 140

Ala Val Gln Thr Leu Pro Ser Leu Trp Trp Val Ile Val Leu Met Val
 145 150 155 160

Val Leu Ile Phe Gly Leu Thr Ala Val Met Met Gly Met Met Gly Pro
 165 170 175

Arg Phe Ala Lys Phe Gln Thr Leu Leu Glu Arg Ile Asn Ala Ile Ala
 180 185 190

Lys Glu Asn Leu Arg Gly Val Arg Val Val Lys Ser Phe Val Gln Glu
 195 200 205

Lys Glu Gln Phe Ala Lys Phe Thr Glu Val Ser Asp Glu Leu Leu Gly
 210 215 220
 Gln Asn Leu Tyr Ile Gly Tyr Ala Phe Ser Val Val Glu Pro Phe Met
 225 230 235 240
 Met Leu Val Gly Tyr Gly Ala Val Phe Leu Ser Ile Trp Leu Val Ala
 245 250 255
 Gly Met Val Gln Ser Asp Pro Ser Val Val Gly Ser Ile Ala Ser Phe
 260 265 270
 Val Asn Tyr Leu Ser Gln Ile Ile Phe Thr Ile Val Met Val Gly Phe
 275 280 285
 Leu Gly Asn Ser Val Ser Arg Ala Met Ile Ser Met Arg Arg Ile Arg
 290 295 300
 Glu Ile Leu Asp Ala Glu Pro Ala Met Thr Phe Lys Asp Ile Pro Asp
 305 310 315 320
 Glu Glu Leu Val Gly Ser Leu Ser Phe Glu Asn Val Thr Phe Thr Tyr
 325 330 335
 Pro Met Asp Lys Glu Pro Met Leu Lys Asp Val Ser Phe Thr Ile Glu
 340 345 350
 Pro Gly Gln Met Val Gly Val Val Gly Ala Thr Gly Ala Gly Lys Ser
 355 360 365
 Thr Leu Ala Gln Leu Ile Pro Arg Leu Phe Asp Pro Gln Asp Gly Ala
 370 375 380
 Ile Lys Ile Gly Gly Lys Asp Ile Arg Glu Val Ser Glu Gly Thr Leu
 385 390 395 400
 Arg Lys Thr Val Ser Ile Val Leu Gln Arg Ala Ile Leu Phe Ser Gly
 405 410 415
 Thr Ile Ala Asp Asn Leu Arg Gln Gly Lys Gly Asn Ala Thr Leu Phe

420 425 430
 Glu Met Glu Arg Ala Ala Asn Ile Ala Gln Ala Ser Glu Phe Ile His
 435 440 445
 Arg Met Glu Lys Thr Phe Glu Ser Pro Val Glu Glu Arg Gly Thr Asn
 450 455 460
 Phe Ser Gly Gly Gln Lys Gln Arg Met Ser Ile Ala Arg Gly Ile Val
 465 470 475 480
 Ser Asn Pro Arg Ile Leu Ile Phe Asp Asp Ser Thr Ser Ala Leu Asp
 485 490 495
 Ala Lys Ser Glu Arg Leu Val Gln Glu Ala Leu Asn Lys Asp Leu Lys
 500 505 510
 Gly Thr Thr Thr Ile Ile Ile Ala Gln Lys Ile Ser Ser Val Val His
 515 520 525
 Ala Asp Lys Ile Leu Val Leu Asn Gln Gly Arg Leu Ile Gly Gln Gly
 530 535 540
 Thr His Ala Asp Leu Val Ala Asn Asn Ala Val Tyr Arg Glu Ile Tyr
 545 550 555 560
 Glu Thr Gln Lys

 <210> 732
 <211> 338
 <212> PFT
 <213> Streptococcus pneumoniae

 <400> 732
 Met Glu Lys Gln Thr Val Ala Val Leu Gly Pro Gly Ser Trp Gly Thr
 1 5 10 15
 Ala Leu Ser Gln Val Leu Asn Asp Asn Gly His Glu Val Arg Ile Trp
 20 25 30
 Gly Asn Leu Pro Glu Gln Ile Asn Glu Ile Asn Thr His His Thr Asn

35	40	45
Lys His Tyr Phe Lys Asp	Val Val Leu Asp Glu Asn Ile Ile Ala Tyr	
50	55	60
Thr Asp Leu Ala Glu Thr	Leu Lys Asp Val Asp Ala Ile Leu Phe Val	
65	70	75
Val Pro Thr Lys Val Thr Arg Leu Val Ala Gln Gln Val Ala Gln Thr		
85	90	95
Leu Asp His Lys Val Ile Ile Met His Ala Ser Lys Gly Leu Glu Pro		
100	105	110
Asp Ser His Lys Arg Leu Ser Thr Ile Leu Glu Glu Glu Ile Pro Glu		
115	120	125
His Leu Arg Ser Asp Ile Val Val Val Ser Gly Pro Ser His Ala Glu		
130	135	140
Glu Thr Ile Val Arg Asp Leu Thr Leu Ile Thr Ala Ala Ser Lys Asp		
145	150	155
Leu Gln Thr Ala Gln Tyr Val Gln Lys Leu Phe Ser Asn His Tyr Phe		
165	170	175
Arg Leu Tyr Thr Asn Thr Asp Val Ile Gly Val Glu Thr Ala Gly Ala		
180	185	190
Leu Lys Asn Ile Ile Ala Val Gly Ala Gly Ala Leu His Gly Leu Gly		
195	200	205
Phe Gly Asp Asn Ala Lys Ala Ala Ile Ile Ala Arg Gly Leu Ala Glu		
210	215	220
Ile Thr Arg Leu Gly Val Ala Leu Gly Ala Ser Pro Leu Thr Tyr Ser		
225	230	235
Gly Leu Ser Gly Val Gly Asp Leu Ile Val Thr Gly Thr Ser Ile His		
245	250	255

Ser Arg Asn Trp Arg Ala Gly Asp Ala Leu Gly Arg Gly Glu Ser Leu
 260 265 270

Ala Asp Ile Glu Ala Asn Met Gly Met Val Ile Glu Gly Ile Ser Thr
 275 280 285

Thr Arg Ala Ala Tyr Glu Leu Ala Gln Glu Leu Gly Val Tyr Met Pro
 290 295 300

Ile Thr Gln Ala Ile Tyr Gln Val Ile Tyr His Gly Thr Asn Ile Lys
 305 310 315 320

Asp Ala Ile Tyr Asp Ile Met Asn Asn Glu Phe Lys Ala Glu Asn Glu
 325 330 335

Trp Ser

<210> 733

<211> 423

<212> PRT

<213> Streptococcus pneumoniae

<400> 733

Met Ser Ser Lys Phe Met Lys Ser Ala Ala Val Leu Gly Thr Ala Thr
 1 5 10 15

Leu Ala Ser Leu Leu Leu Val Ala Cys Gly Ser Lys Thr Ala Asp Lys
 20 25 30

Pro Ala Asp Ser Gly Ser Ser Glu Val Lys Glu Leu Thr Val Tyr Val
 35 40 45

Asp Glu Gly Tyr Lys Ser Tyr Ile Glu Glu Val Ala Lys Ala Tyr Glu
 50 55 60

Lys Glu Ala Gly Val Lys Val Thr Leu Lys Thr Gly Asp Ala Leu Gly
 65 70 75 80

Gly Leu Asp Lys Leu Ser Leu Asp Asn Gln Ser Gly Asn Val Pro Asp
 85 90 95

Val Met Met Ala Pro Tyr Asp Arg Val Gly Ser Leu Gly Ser Asp Gly
 100 105 110

Gln Leu Ser Glu Val Lys Leu Ser Asp Gly Ala Lys Thr Asp Asp Thr
 115 120 125

Thr Lys Ser Leu Val Thr Ala Ala Asn Gly Lys Val Tyr Gly Ala Pro
 130 135 140

Ala Val Ile Glu Ser Leu Val Met Tyr Tyr Asn Lys Asp Leu Val Lys
 145 150 155 160

Asp Ala Pro Lys Thr Phe Ala Asp Leu Glu Asn Leu Ala Lys Asp Ser
 165 170 175

Lys Tyr Ala Phe Ala Gly Glu Asp Gly Lys Thr Thr Ala Phe Leu Ala
 180 185 190

Asp Trp Thr Asn Phe Tyr Tyr Thr Tyr Gly Leu Leu Ala Gly Asn Gly
 195 200 205

Ala Tyr Val Phe Gly Gln Asn Gly Lys Asp Ala Lys Asp Ile Gly Leu
 210 215 220

Ala Asn Asp Gly Ser Ile Val Gly Ile Asn Tyr Ala Lys Ser Trp Tyr
 225 230 235 240

Glu Lys Trp Pro Lys Gly Met Gln Asp Thr Glu Gly Ala Gly Asn Leu
 245 250 255

Ile Gln Thr Gln Phe Gln Glu Gly Lys Thr Ala Ala Ile Ile Asp Gly
 260 265 270

Pro Trp Lys Ala Gln Ala Phe Lys Asp Ala Lys Val Asn Tyr Gly Val
 275 280 285

Ala Thr Ile Pro Thr Leu Pro Asn Gly Lys Glu Tyr Ala Ala Phe Gly
 290 295 300

Gly Gly Lys Ala Trp Val Ile Pro Gln Ala Val Lys Asn Leu Glu Ala
 305 310 315 320

Ser Gln Lys Phe Val Asp Phe Leu Val Ala Thr Glu Gln Gln Lys Val
 325 330 335

Leu Tyr Asp Lys Thr Asn Glu Ile Pro Ala Asn Thr Glu Ala Arg Ser
 340 345 350

Tyr Ala Glu Gly Lys Asn Asp Glu Leu Thr Thr Ala Val Ile Lys Gln
 355 360 365

Phe Lys Asn Thr Gln Pro Leu Pro Asn Ile Ser Gln Met Ser Ala Val
 370 375 380

Trp Asp Pro Ala Lys Asn Met Leu Phe Asp Ala Val Ser Gly Gln Lys
 385 390 395 400

Asp Ala Lys Thr Ala Ala Asn Asp Ala Val Thr Leu Ile Lys Glu Thr
 405 410 415

Ile Lys Gln Lys Phe Gly Glu
 420

<210> 734

<211> 335

<212> PRT

<213> Streptococcus pneumoniae

<400> 734

Met Thr Glu Lys Leu Ile Asn Ser Lys Pro Asn Gly Val Phe Ala Leu
 1 5 10 15

Ile Leu Ile Glu Leu Thr Ile Val Leu Gly Ile Phe Ile Phe Ile Met
 20 25 30

Gly Val Gly Ser Glu Asn Ile Phe Gly Ile Ile Ile Gly Pro Leu Leu
 35 40 45

Ile Val Ile Ala Gly Leu Ala His Ala Gly Leu Lys Val Val Lys Pro
 50 55 60

Gln Glu Ala Leu Val Leu Thr Leu Phe Gly Asn Tyr Thr Gly Thr Ile
 65 70 75 80

Lys Glu Pro Gly Phe Tyr Phe Val Asn Pro Phe Ser Val Ala Val Asn
 85 90 95

Pro Ala Asn His Thr Arg Leu Gly Gln Ser Gly Asp Val Ser Thr Lys
 100 105 110

Ser Pro Phe Leu Gly Ala Lys Ser Asn Asp Asn Asp Val Asn Leu
 115 120 125

Glu Ile Gly Lys Lys Gln Ile Ser Leu Lys Val Met Thr Leu Ser Asn
 130 135 140

Ser Arg Gln Lys Ile Asn Asp Cys Leu Gly Asn Pro Val Glu Ile Gly
 145 150 155 160

Ile Ala Val Thr Trp Arg Val Val Asp Thr Ala Lys Ala Val Phe Asn
 165 170 175

Val Asp Asn Tyr Lys Glu Tyr Leu Ser Leu Gln Cys Asp Ser Ala Leu
 180 185 190

Arg Asn Ile Val Arg Ile Tyr Pro Tyr Asp Val Ser Pro Asn Val Asp
 195 200 205

Thr Thr Gly Asp Gly Gln Ala Asp Glu Gly Ser Leu Arg Gly Ser Ser
 210 215 220

Glu Ile Val Ala Asn Arg Ile Arg Glu Glu Ile Gln Ser Arg Val Glu
 225 230 235 240

Asp Ala Gly Leu Glu Ile Leu Glu Ala Arg Ile Thr Tyr Leu Ala Tyr
 245 250 255

Ala Pro Glu Ile Ala Ala Val Met Leu Gln Arg Gln Gln Ala Ser Ala
 260 265 270

Ile Ile Asp Ala Arg Lys Met Ile Val Asp Gly Ala Val Gly Met Val
 275 280 285

Glu Met Ala Leu Glu Arg Leu Asn Glu Gly Glu Leu Val Glu Leu Asp
 290 295 300

Glu Glu Arg Lys Ala Ala Met Val Ser Asn Leu Leu Val Val Leu Cys
 305 310 315 320

Gly Asn His Asp Ala Gln Pro Ile Val Asn Thr Gly Ser Leu Tyr
 325 330 335

<210> 735

<211> 338

<212> PRT

<213> Streptococcus pneumoniae

<400> 735

Met Thr Asn Ser Val Phe Gln Gly Arg Ser Phe Leu Ala Glu Lys Asp
 1 5 10 15

Phe Thr Arg Ala Glu Leu Glu Tyr Leu Ile Gly Leu Ser Ala His Leu
 20 25 30

Lys Asp Leu Lys Lys Arg Asn Ile Gln His His Tyr Leu Ala Gly Lys
 35 40 45

Asn Ile Ala Leu Leu Phe Glu Lys Thr Ser Thr Arg Thr Arg Ala Ala
 50 55 60

Phe Thr Thr Ala Ala Ile Asp Leu Gly Ala His Pro Glu Tyr Leu Gly
 65 70 75 80

Ala Asn Asp Ile Gln Leu Gly Lys Lys Glu Ser Thr Glu Asp Thr Ala
 85 90 95

Lys Val Leu Gly Arg Met Phe Asp Gly Ile Glu Phe Arg Gly Phe Ser
 100 105 110

Gln Arg Met Val Glu Glu Leu Ala Glu Phe Ser Gly Val Pro Val Trp
 115 120 125

Asn Gly Leu Thr Asp Glu Trp His Pro Thr Gln Met Leu Ala Asp Tyr
 130 135 140

Leu Thr Val Gln Glu Asn Phe Gly Arg Leu Glu Gly Leu Thr Leu Val
 145 150 155 160

Tyr Cys Gly Asp Gly Arg Asn Asn Val Ala Asn Ser Leu Leu Val Thr
 165 170 175

Gly Ala Ile Leu Gly Val Asn Val His Ile Phe Ser Pro Lys Glu Leu
 180 185 190

Phe Pro Glu Lys Glu Ile Val Glu Leu Ala Glu Gly Phe Ala Lys Glu
 195 200 205

Ser Gly Ala His Val Leu Ile Thr Glu Asp Ala Asp Glu Ala Val Lys
 210 215 220

Asp Ala Asp Val Leu Tyr Thr Asp Val Trp Val Ser Met Gly Glu Glu
 225 230 235 240

Asp Lys Phe Ala Glu Arg Val Ala Leu Leu Lys Pro Tyr Gln Val Asn
 245 250 255

Met Asp Leu Val Lys Lys Ala Gly Asn Glu Asn Leu Ile Phe Leu His
 260 265 270

Cys Leu Pro Ala Phe His Asp Thr His Thr Val Tyr Gly Lys Asp Val
 275 280 285

Ala Glu Lys Phe Gly Val Glu Glu Met Glu Val Thr Asp Glu Val Phe
 290 295 300

Arg Ser Lys Tyr Ala Arg His Phe Asp Gln Ala Glu Asn Arg Met His
 305 310 315 320

Thr Ile Lys Ala Val Met Ala Ala Thr Leu Gly Asn Leu Tyr Ile Pro
 325 330 335

Lys Val

<210> 736

<211> 299

<212> PRT

<213> Streptococcus pneumoniae

<400> 736

Met Ala Ile Phe Phe Met Ile Phe Leu Ile Val Cys Val Leu Leu Leu
 1 5 10 15

Val Ile Val Thr Leu Ser Thr Val Tyr Val Val Arg Gln Gln Ser Val
 20 25 30

Ala Ile Ile Glu Arg Phe Gly Lys Tyr Gln Lys Val Ala Asn Ser Gly
 35 40 45

Ile His Ile Arg Leu Pro Phe Gly Ile Asp Ser Ile Ala Ala Arg Ile
 50 55 60

Gln Leu Arg Leu Leu Gln Ser Asp Ile Val Val Glu Thr Lys Thr Lys
 65 70 75 80

Asp Asn Val Phe Val Met Met Asn Val Ala Thr Gln Tyr Arg Val Asn
 85 90 95

Glu Gln Ser Val Thr Asp Ala Tyr Tyr Lys Leu Ile Arg Pro Glu Ser
 100 105 110

Gln Ile Lys Ser Tyr Ile Glu Asp Ala Leu Arg Ser Ser Val Pro Lys
 115 120 125

Leu Thr Leu Asp Glu Leu Phe Glu Lys Lys Asp Glu Ile Ala Leu Glu
 130 135 140

Val Gln His Gln Val Ala Glu Glu Met Thr Thr Tyr Gly Tyr Ile Ile
 145 150 155 160

Val Lys Thr Leu Ile Thr Lys Val Glu Pro Asp Ala Glu Val Lys Gln
 165 170 175

Ser Met Asn Glu Ile Asn Ala Ala Gln Arg Lys Arg Val Ala Ala Gln
 180 185 190

Glu Leu Ala Glu Ala Asp Lys Ile Lys Ile Val Thr Ala Ala Glu Ala
 195 200 205

Glu Ala Glu Lys Asp Arg Leu His Gly Val Gly Ile Ala Gln Gln Arg

210 215 220
 Lys Ala Ile Val Asp Gly Leu Ala Glu Ser Ile Thr Glu Leu Lys Glu
 225 230 235 240
 Ala Asn Val Gly Met Thr Glu Glu Gln Ile Met Ser Ile Leu Leu Thr
 245 250
 Asn Gln Tyr Leu Asp Thr Leu Asn Thr Phe Ala Ser Lys Gly Asn Gln
 260 265 270
 Thr Ile Phe Leu Pro Asn Thr Pro Asn Gly Val Asp Asp Ile Arg Thr
 275 280 285
 Gln Ile Leu Ser Ala Leu Arg Ala Glu Lys Lys
 290 295
 <210> 737
 <211> 173
 <212> PRT
 <213> Streptococcus pneumoniae
 <400> 737
 Met Arg Lys Phe Arg Tyr Asn Ser Gln Thr Arg Ser Arg Phe Lys Glu
 1 5 10 15
 Arg Gly Gly Phe Val Met Arg Phe Lys Asn Thr Ser Asp His Ile Glu
 20 25 30
 Ala Tyr Ile Lys Ala Ile Leu Asp Gln Ser Gly Ile Val Glu Leu Gln
 35 40 45
 Arg Ser Gln Leu Ala Asp Thr Phe Gln Val Val Pro Ser Gln Ile Asn
 50 55 60
 Tyr Val Ile Lys Thr Arg Phe Thr Glu Ser Arg Gly Tyr Leu Val Glu
 65 70 75 80
 Ser Lys Arg Gly Gly Gly Gly Tyr Ile Arg Ile Gly Arg Ile Glu Phe
 85 90 95
 Ser Ser His His Glu Met Leu Arg Glu Leu Leu Tyr Ser Ile Gly Glu

100 105 110

Arg Val Ser Gln Glu Ile Tyr Glu Asp Ile Leu Gln Leu Leu Val Glu
115 120 125

Gln Glu Leu Met Thr Lys Gln Glu Met Asn Leu Leu Glu Ser Val Ala
130 135 140

Leu Asp Arg Val Leu Gly Glu Glu Ala Pro Val Val Arg Ala Asn Met
145 150 155 160

Leu Arg Gln Ile Ile Gln Glu Val Asp Arg Lys Gly Lys
165 170

<210> 738
<211> 150
<212> PRT
<213> Streptococcus pneumoniae

<400> 738

Met Lys Val Ile Phe Leu Ala Asp Val Lys Gly Lys Gly Lys Lys Gly
1 5 10 15

Glu Ile Lys Glu Val Pro Thr Gly Tyr Ala Gln Asn Phe Leu Ile Lys
20 25 30

Lys Asn Leu Ala Lys Glu Ala Thr Ala Gln Ala Val Gly Glu Leu Arg
35 40 45

Gly Lys Gln Lys Ser Glu Glu Lys Ala His Ala Glu Met Ile Ala Glu
50 55 60

Gly Lys Ala Ile Lys Ala Gln Leu Glu Ala Glu Glu Thr Val Val Glu
65 70 75 80

Phe Val Glu Lys Val Gly Pro Asp Gly Arg Thr Phe Gly Ser Ile Thr
85 90 95

Asn Lys Lys Ile Ala Glu Glu Leu Gln Lys Gln Phe Gly Ile Lys Ile
100 105 110

Asp Lys Arg His Ile Gln Val Gln Ala Pro Ile Arg Ala Val Gly Leu

115	120	125
Ile Asp Val Pro Val Lys	Ile Tyr Gln Asp Ile	Thr Ser Val Ile Asn
130	135	140
Leu Arg Val Lys Glu Gly		
145	150	
<210> 739		
<211> 182		
<212> PRT		
<213> Streptococcus pneumoniae		
<400> 739		
Met Ile Lys Tyr Ser Ile Arg Gly Glu Asn Leu Glu Val Thr Glu Ala		
1	5	10 15
Ile Arg Asp Tyr Val Val Ser Lys Leu Glu Lys Ile Glu Lys Tyr Phe		
20	25	30
Gln Pro Glu Gln Glu Leu Asp Ala Arg Ile Asn Leu Lys Val Tyr Arg		
35	40	45
Glu Lys Thr Ala Lys Val Glu Val Thr Ile Pro Leu Gly Ser Ile Thr		
50	55	60
Leu Arg Ala Glu Asp Val Ser Gln Asp Met Tyr Gly Ser Ile Asp Leu		
65	70	75 80
Val Thr Asp Lys Ile Glu Arg Gln Ile Arg Lys Asn Lys Thr Lys Ile		
85	90	95
Glu Arg Lys Asn Lys Asn Lys Val Ala Thr Gly Gln Leu Phe Thr Asp		
100	105	110
Ala Leu Val Glu Asp Ser Asn Ile Val Gln Ser Lys Val Val Arg Ser		
115	120	125
Lys Gln Ile Asp Leu Lys Pro Met Asp Leu Glu Glu Ala Ile Leu Gln		
130	135	140
Met Asp Leu Leu Gly His Asp Phe Phe Ile Tyr Val Asp Val Glu Asp		

145 150 155 160

Gln Thr Thr Asn Val Ile Tyr Arg Arg Glu Asp Gly Glu Ile Gly Leu
165 170 175

Leu Glu Val Lys Glu Ser
180

<210> 740
<211> 346
<212> PRT
<213> Streptococcus pneumoniae

<400> 740

Met Ala Glu Ile Thr Ala Lys Leu Val Lys Glu Leu Arg Glu Lys Ser
1 5 10 15

Gly Ala Gly Val Met Asp Ala Lys Lys Ala Leu Val Glu Thr Asp Gly
20 25 30

Asp Ile Glu Lys Ala Ile Glu Leu Leu Arg Glu Lys Gly Met Ala Lys
35 40 45

Ala Ala Lys Lys Ala Asp Arg Val Ala Ala Glu Gly Leu Thr Gly Val
50 55 60

Tyr Val Asn Gly Asn Val Ala Ala Val Ile Glu Val Asn Ala Glu Thr
65 70 75 80

Asp Phe Val Ala Lys Asn Ala Gln Phe Val Glu Leu Val Asn Thr Thr
85 90 95

Ala Lys Val Ile Ala Glu Gly Lys Pro Ala Asn Asn Glu Glu Ala Leu
100 105 110

Ala Leu Ile Met Pro Ser Gly Glu Thr Leu Glu Ala Ala Tyr Val Ser
115 120 125

Ala Thr Ala Thr Ile Gly Glu Lys Ile Ser Phe Arg Arg Phe Ala Leu
130 135 140

Ile Glu Lys Thr Asp Ala Gln His Phe Gly Ala Tyr Gln His Asn Glu

145		150		155		160
Gly Arg Ile	Gly Val Ile	Ser Val Val	Glu Gly Gly	Asp Glu Ala	Leu	
	165		170		175	
Ala Lys Gln	Leu Ser Met His	Ile Ala Ala	Met Lys Pro Thr	Val Leu		
	180		185		190	
Ser Tyr Lys	Glu Leu Asp	Glu Gln Phe	Val Lys Asp	Glu Leu Ala	Gln	
	195		200		205	
Leu Asn His	Val Ile Asp	Gln Asp Asn	Glu Ser Arg	Ala Met Val	Asn	
	210		215		220	
Lys Pro Ala	Leu Pro His	Leu Lys Tyr	Gly Ser Lys	Ala Gln Leu	Thr	
	225		230		235	
Asp Asp Val	Ile Ala Gln	Ala Glu Ala	Asp Ile Lys	Ala Glu Leu	Ala	
	245		250		255	
Ala Glu Gly	Lys Pro Glu	Lys Ile Trp	Asp Lys Ile	Ile Pro Gly	Lys	
	260		265		270	
Met Asp Arg	Phe Met Leu	Asp Asn Thr	Lys Val Asp	Gln Ala Tyr	Thr	
	275		280		285	
Leu Leu Ala	Gln Val Tyr	Ile Met Asp	Asp Ser Lys	Thr Val Glu	Ala	
	290		295		300	
Tyr Leu Glu	Ser Val Asn	Ala Ser Val	Val Glu Phe	Ala Arg Phe	Glu	
	305		310		315	
Val Gly Glu	Gly Ile Glu	Lys Ala Ala	Asn Asp Phe	Glu Ala Glu	Val	
	325		330		335	
Ala Ala Thr	Met Ala Ala	Ala Ala Leu	Asn Asn			
	340		345			

<210> 741
 <211> 286
 <212> PRT
 <213> Streptococcus pneumoniae

<400> 741

Met Asn Cys Glu Ala Val Ala Leu Gly Ser Phe Cys Glu Leu Lys Ser
 1 5 10 15

Arg Arg Gly Lys Lys Gln Lys Gly Glu Ile Leu Met Ala Val Ile Ser
 20 25 30

Met Lys Gln Leu Leu Glu Ala Gly Val His Phe Gly His Gln Thr Arg
 35 40 45

Arg Trp Asn Pro Lys Met Ala Lys Tyr Ile Phe Thr Glu Arg Asn Gly
 50 55 60

Ile His Val Ile Asp Leu Gln Gln Thr Val Lys Tyr Ala Asp Gln Ala
 65 70 75 80

Tyr Asp Phe Met Arg Asp Ala Ala Ala Asn Asp Ala Val Val Leu Phe
 85 90 95

Val Gly Thr Lys Lys Gln Ala Ala Asp Ala Val Ala Glu Glu Ala Val
 100 105 110

Arg Ser Gly Gln Tyr Phe Ile Asn His Arg Trp Leu Gly Gly Thr Leu
 115 120 125

Thr Asn Trp Gly Thr Ile Gln Lys Arg Ile Ala Arg Leu Lys Glu Ile
 130 135 140

Lys Arg Met Glu Glu Asp Gly Thr Phe Glu Val Leu Pro Lys Lys Glu
 145 150 155 160

Val Ala Leu Leu Asn Lys Gln Arg Ala Arg Leu Glu Lys Phe Leu Gly
 165 170 175

Gly Ile Glu Asp Met Pro Arg Ile Pro Asp Val Met Tyr Val Val Asp
 180 185 190

Pro His Lys Glu Gln Ile Ala Val Lys Glu Ala Lys Lys Leu Gly Ile
 195 200 205

Pro Val Val Ala Met Val Asp Thr Asn Thr Asp Pro Asp Asp Ile Asp
 210 215 220

Val Ile Ile Pro Ala Asn Asp Asp Ala Ile Arg Ala Val Lys Leu Ile
 225 230 235 240

Thr Ala Lys Leu Ala Asp Ala Ile Ile Glu Gly Arg Gln Gly Glu Asp
 245 250 255

Ala Val Ala Val Glu Ala Glu Phe Ala Ala Leu Glu Thr Gln Ala Asp
 260 265 270

Ser Ile Glu Glu Ile Val Glu Val Val Glu Gly Asp Asn Ala
 275 280 285

<210> 742

<211> 272

<212> PRT

<213> Streptococcus pneumoniae

<400> 742

Met Asn Arg Phe Lys Lys Ser Lys Tyr Val Ile Ile Val Phe Val Thr
 1 5 10 15

Val Leu Leu Val Ser Ala Leu Leu Ala Thr Thr Tyr Ser Ser Thr Ile
 20 25 30

Val Thr Lys Leu Gly Asp Gly Ile Ser Leu Val Asp Arg Val Val Gln
 35 40 45

Lys Pro Phe Gln Trp Phe Asp Ser Val Lys Ser Asp Leu Ala His Leu
 50 55 60

Thr Arg Thr Tyr Asn Glu Asn Glu Ser Leu Lys Lys Gln Leu Tyr Gln
 65 70 75 80

Leu Glu Val Lys Ser Asn Glu Val Glu Ser Leu Lys Thr Glu Asn Glu
 85 90 95

Gln Leu Arg Gln Leu Leu Asp Met Lys Ser Lys Leu Gln Ala Thr Lys
 100 105 110

Thr Leu Ala Ala Asp Val Ile Met Arg Ser Pro Val Ser Trp Lys Gln
 115 120 125

Glu Leu Thr Leu Asp Ala Gly Arg Ser Lys Gly Ala Ser Glu Asn Met
 130 135 140

Leu Ala Ile Ala Asn Gly Gly Leu Ile Gly Ser Val Ser Lys Val Glu
 145 150 155 160

Glu Asn Ser Thr Ile Val Asn Leu Leu Thr Asn Thr Glu Asn Ala Asp
 165 170 175

Lys Ile Ser Val Lys Ile Gln His Gly Ser Thr Thr Ile Tyr Gly Ile
 180 185 190

Ile Ile Gly Tyr Asp Lys Glu Asn Asp Val Leu Lys Ile Ser Gln Leu
 195 200 205

Asn Ser Asn Ser Asp Ile Ser Ala Gly Asp Lys Val Thr Thr Gly Gly
 210 215 220

Leu Gly Asn Phe Asn Val Ala Asp Ile Pro Val Gly Glu Val Val Ala
 225 230 235 240

Thr Thr His Ser Thr Asp Tyr Leu Thr Arg Glu Val Thr Val Lys Leu
 245 250 255

Ser Ala Asp Thr His Asn Val Asp Val Ile Glu Leu Val Gly Asn Ser
 260 265 270

<210> 743

<211> 275

<212> PRT

<213> Streptococcus pneumoniae

<400> 743

Met Lys Ser Ile Ile Asp Val Lys Asn Leu Ser Phe Arg Tyr Lys Glu
 1 5 10 15

Asn Gln Asn Tyr Tyr Asp Val Lys Asp Ile Thr Phe His Val Lys Arg
 20 25 30

Gly Glu Trp Leu Ser Ile Val Gly His Asn Gly Ser Gly Lys Ser Thr
 35 40 45
 Thr Val Arg Leu Ile Asp Gly Leu Leu Glu Ala Glu Ser Gly Glu Ile
 50 55 60
 Val Ile Asp Gly Gln Arg Leu Thr Glu Glu Asn Val Trp Asn Ile Arg
 65 70 75 80
 Arg Gln Ile Gly Met Val Phe Gln Asn Pro Asp Asn Gln Phe Val Gly
 85 90 95
 Ala Thr Val Glu Asp Asp Val Ala Phe Gly Leu Glu Asn Gln Gly Leu
 100 105 110
 Ser Arg Gln Glu Met Lys Lys Arg Val Glu Glu Ala Leu Ala Leu Val
 115 120 125
 Gly Met Leu Asp Phe Lys Lys Arg Glu Pro Ala Arg Leu Ser Gly Gly
 130 135 140
 Gln Lys Gln Arg Val Ala Ile Ala Gly Val Val Ala Leu Arg Pro Ala
 145 150 155 160
 Ile Leu Ile Leu Asp Glu Ala Thr Ser Met Leu Asp Pro Glu Gly Arg
 165 170 175
 Arg Glu Leu Ile Gly Thr Val Lys Gly Ile Arg Lys Asp Tyr Asp Met
 180 185 190
 Thr Val Ile Ser Ile Thr His Asp Leu Glu Glu Val Ala Met Ser Asp
 195 200 205
 Arg Val Leu Val Met Lys Lys Gly Glu Ile Glu Ser Thr Ser Ser Pro
 210 215 220
 Arg Glu Leu Phe Ser Arg Asn Asp Leu Asp Gln Ile Gly Leu Asp Asp
 225 230 235 240
 Pro Phe Ala Asn Gln Leu Lys Lys Ser Leu Ser Gln Asn Gly Tyr Asp
 245 250 255

Leu Pro Glu Asn Tyr Leu Thr Glu Ser Glu Leu Glu Asp Lys Leu Trp
 260 265 270

Glu Leu Leu
 275

<210> 744

<211> 276

<212> PRT

<213> Streptococcus pneumoniae

<400> 744

Met Thr Ser Met Arg Lys Lys Thr Ile Gly Glu Val Leu Arg Leu Ala
 1 5 10 15

Arg Ile Asn Gln Gly Leu Ser Leu Asp Glu Leu Gln Lys Lys Thr Glu
 20 25 30

Ile Gln Leu Asp Met Leu Glu Ala Met Glu Ala Asp Asp Phe Asp Gln
 35 40 45

Leu Pro Ser Pro Phe Tyr Thr Arg Ser Phe Leu Lys Lys Tyr Ala Trp
 50 55 60

Ala Val Glu Leu Asp Asp Gln Ile Val Leu Asp Ala Tyr Asp Ser Gly
 65 70 75 80

Ser Met Ile Thr Tyr Glu Glu Val Asp Val Asp Glu Asp Glu Leu Thr
 85 90 95

Gly Arg Arg Arg Ser Ser Lys Lys Lys Lys Lys Thr Ser Phe Leu
 100 105 110

Pro Leu Phe Tyr Phe Ile Leu Phe Ala Leu Ser Ile Leu Ile Phe Val
 115 120 125

Thr Tyr Tyr Val Trp Asn Tyr Ile Gln Thr Gln Pro Glu Glu Pro Ser
 130 135 140

Leu Ser Asn Tyr Ser Val Val Gln Ser Thr Ser Ser Thr Ser Ser Val
 145 150 155 160

Pro His Ser Ser Ser Ser Ser Ser Ser Ser Ile Glu Ser Ala Ile Ser
165 170 175

Val Ser Gly Glu Gly Asn His Val Glu Ile Ala Tyr Lys Thr Ser Lys
180 185 190

Glu Thr Val Lys Leu Gln Leu Ala Val Ser Asp Val Thr Ser Trp Val
195 200 205

Ser Val Ser Glu Ser Glu Leu Glu Gly Gly Val Thr Leu Ser Pro Lys
210 215 220

Lys Lys Ser Ala Glu Ala Thr Val Ala Thr Lys Ser Pro Val Thr Ile
225 230 235 240

Thr Leu Gly Val Val Lys Gly Val Asp Leu Thr Val Asp Asn Gln Thr
245 250 255

Val Asp Leu Ser Lys Leu Thr Ala Gln Thr Gly Gln Ile Thr Val Thr
260 265 270

Phe Thr Lys Asn
275

<210> 745

<211> 339

<212> PRT

<213> Streptococcus pneumoniae

<400> 745

Met Glu Asn Leu Val Lys Ser Thr Ser Tyr Thr Tyr Ile Pro Glu Glu
1 5 10 15

Ile Met Ser Phe Ser Asp Leu Lys Leu Phe Ala Leu Ser Ser Asn Lys
20 25 30

Glu Leu Ala Glu Arg Val Ala Gln Glu Ile Gly Ile Glu Leu Gly Lys
35 40 45

Ser Ser Val Arg Gln Phe Ser Asp Gly Glu Ile Gln Val Asn Ile Glu
50 55 60

Glu Ser Ile Arg Gly Lys His Val Phe Ile Leu Gln Ser Thr Ser Ser
 65 70 75 80

Pro Val Asn Asp Asn Leu Leu Glu Ile Leu Ile Met Val Asp Ala Leu
 85 90 95

Lys Arg Ala Ser Ala Glu Ser Val Asn Val Val Met Pro Tyr Tyr Gly
 100 105 110

Tyr Ala Arg Gln Asp Arg Lys Ala Arg Ala Arg Glu Pro Ile Thr Ser
 115 120 125

Lys Leu Val Ala Asn Met Leu Glu Val Ala Gly Val Asp Arg Leu Leu
 130 135 140

Thr Ile Asp Leu His Ala Ala Gln Ile Gln Gly Phe Phe Asp Ile Pro
 145 150 155 160

Val Asp His Leu Met Gly Ala Pro Leu Ile Ala Asp Tyr Phe Glu Arg
 165 170 175

Arg Gly Met Val Gly Ser Asp Tyr Val Val Val Ser Pro Asp His Gly
 180 185 190

Gly Val Thr Arg Ala Arg Lys Leu Ala Glu Phe Leu Lys Thr Ser Ile
 195 200 205

Ala Ile Ile Asp Lys Arg Arg Ser Val Asp Lys Met Asn Thr Ser Glu
 210 215 220

Val Met Asn Ile Ile Gly Lys Val Glu Gly Lys Thr Cys Ile Leu Ile
 225 230 235 240

Asp Asp Met Ile Asp Thr Ala Gly Thr Ile Cys His Ala Ala Asp Ala
 245 250 255

Leu Ala Glu Ala Gly Ala Val Glu Val Tyr Ala Ser Cys Thr His Pro
 260 265 270

Val Leu Ser Gly Pro Ala Thr Asp Asn Ile Gln Lys Ser Ala Ile Lys
 275 280 285

Lys Leu Val Val Leu Asp Thr Ile Tyr Leu Pro Glu Glu Arg Leu Ile
 290 295 300

Asp Lys Ile Glu Gln Ile Ser Ile Ala His Leu Leu Gly Asp Ala Ile
 305 310 315 320

Val Arg Ile His Glu Lys Arg Pro Leu Ser Pro Leu Phe Asp Ile Glu
 325 330 335

Lys Lys Ile

<210> 746

<211> 220

<212> PRT

<213> Streptococcus pneumoniae

<400> 746

Met Asp Leu Thr Lys Arg Phe Asn Lys Gln Leu Asp Lys Ile Gln Val
 1 5 10 15

Ser Leu Ile Arg Gln Phe Asp Gln Ala Ile Ser Glu Ile Pro Gly Val
 20 25 30

Leu Arg Leu Thr Leu Gly Glu Pro Asp Phe Thr Thr Pro Asp His Val
 35 40 45

Lys Glu Ala Gly Lys Arg Ala Ile Asp Gln Asn Gln Ser Tyr Tyr Thr
 50 55 60

Gly Met Ser Gly Leu Leu Thr Leu Arg Gln Ala Ala Ser Asp Phe Val
 65 70 75 80

Lys Glu Lys Tyr Gln Leu Asp Tyr Ala Pro Glu Asn Glu Ile Leu Val
 85 90 95

Thr Ile Gly Ala Thr Glu Ala Leu Ser Ala Thr Leu Thr Ala Ile Leu
 100 105 110

Glu Glu Gly Asp Lys Val Leu Leu Pro Ala Pro Ala Tyr Pro Gly Tyr
 115 120 125

Glu Pro Ile Val Asn Leu Val Gly Ala Glu Ile Val Glu Ile Asp Thr
 130 135 140

Thr Glu Asn Gly Phe Val Leu Thr Pro Glu Met Leu Glu Lys Ala Ile
 145 150 155 160

Leu Glu Gln Gly Asp Lys Leu Lys Ala Val Ile Leu Asn Tyr Pro Ala
 165 170 175

Asn Pro Thr Gly Ile Thr Tyr Ser Arg Glu Gln Leu Glu Ala Leu Ala
 180 185 190

Ala Val Leu Arg Lys Tyr Glu Ile Phe Val Val Cys Asp Glu Val Tyr
 195 200 205

Ser Glu Leu Thr Tyr Thr Gly Glu Ala Met Cys Leu
 210 215 220

<210> 747

<211> 432

<212> PRT

<213> Streptococcus pneumoniae

<400> 747

Met Ile Asn Arg Tyr Ser Arg Pro Glu Met Ala Asn Ile Trp Ser Glu
 1 5 10 15

Glu Asn Lys Tyr Arg Ala Trp Leu Glu Val Glu Ile Leu Ser Asp Glu
 20 25 30

Ala Trp Ala Glu Leu Gly Glu Ile Pro Lys Glu Asp Val Ala Leu Ile
 35 40 45

Arg Lys Lys Ala Asp Phe Asp Ile Asp Arg Ile Leu Glu Ile Glu Gln
 50 55 60

Glu Thr Arg His Asp Val Val Ala Phe Thr Arg Ala Val Ser Glu Thr
 65 70 75 80

Leu Gly Glu Glu Arg Lys Trp Val His Tyr Gly Leu Thr Ser Thr Asp
 85 90 95

Val Val Asp Thr Ala Tyr Gly Tyr Leu Tyr Lys Gln Ala Asn Asp Ile
 100 105 110

Ile Arg Arg Asp Leu Glu Asn Phe Thr Asn Ile Ile Ala Asp Lys Ala
 115 120 125

Lys Glu His Lys Phe Thr Ile Met Met Gly Arg Thr His Gly Val His
 130 135 140

Ala Glu Pro Thr Thr Phe Gly Leu Lys Leu Ala Thr Trp Tyr Ser Glu
 145 150 155 160

Met Lys Arg Asn Ile Glu Arg Phe Glu His Ala Ala Ala Gly Val Glu
 165 170 175

Ala Gly Lys Ile Ser Gly Ala Val Gly Asn Phe Ala Asn Ile Pro Pro
 180 185 190

Phe Val Glu Glu Tyr Val Cys Asp Lys Leu Gly Ile Arg Ala Gln Glu
 195 200 205

Ile Ser Thr Gln Val Leu Pro Arg Asp Leu His Ala Glu Tyr Phe Ala
 210 215 220

Val Leu Ala Ser Ile Ala Thr Ser Ile Glu Arg Met Ala Thr Glu Ile
 225 230 235 240

Arg Gly Leu Gln Lys Ser Glu Gln Arg Glu Val Glu Glu Phe Phe Ala
 245 250 255

Lys Gly Gln Lys Gly Ser Ser Ala Met Pro His Lys Arg Asn Pro Ile
 260 265 270

Gly Ser Glu Asn Met Thr Gly Leu Ala Arg Val Ile Arg Gly His Met
 275 280 285

Ile Thr Ala Tyr Glu Asn Val Ala Leu Trp His Glu Arg Asp Ile Ser
 290 295 300

His Ser Ser Ala Glu Arg Ile Ile Thr Pro Asp Thr Thr Ile Leu Ile

305 310 315 320

Asp Tyr Met Leu Asn Arg Phe Gly Asn Ile Val Lys Asn Leu Thr Val
325 330 335

Phe Pro Glu Asn Met Ile Arg Asn Met Asn Ser Thr Phe Gly Leu Ile
340 345 350

Phe Ser Gln Arg Ala Met Leu Thr Leu Ile Glu Lys Gly Met Thr Arg
355 360 365

Glu Gln Ala Tyr Asp Leu Val Gln Pro Lys Thr Ala Tyr Ser Trp Asp
370 375 380

Asn Gln Val Asp Phe Lys Pro Leu Leu Glu Ala Asp Ser Glu Val Thr
385 390 395 400

Ser Arg Leu Thr Gln Glu Glu Ile Asp Glu Ile Phe Asn Pro Val Tyr
405 410 415

Tyr Thr Lys Arg Val Asp Asp Ile Phe Glu Arg Leu Gly Leu Gly Asp
420 425 430

<210> 748
<211> 301
<212> FRT
<213> Streptococcus pneumoniae

<400> 748

Met Ile Gln Trp Trp Gln Ile Leu Leu Leu Thr Leu Tyr Ser Ala Tyr
1 5 10 15

Gln Ile Cys Asp Glu Leu Thr Ile Val Ser Ser Ala Gly Ser Pro Val
20 25 30

Phe Ala Gly Phe Ile Thr Gly Leu Ile Met Gly Asp Val Thr Thr Gly
35 40 45

Leu Leu Ile Gly Gly Asn Leu Gln Leu Phe Val Leu Gly Val Gly Thr
50 55 60

Phe Gly Gly Ala Ser Arg Ile Asp Ala Thr Ser Gly Ala Val Leu Ala

65		70		75		80
Thr Ala Phe Ser Val Ser Gln Gly Ile Asp Ala Pro Leu Ala Ile Thr						
	85			90		95
Thr Ile Ala Val Pro Val Ala Ala Leu Leu Thr Tyr Phe Asp Val Leu						
	100		105			110
Gly Arg Met Thr Thr Thr Phe Phe Ala His Arg Val Asp Ala Ala Ile						
	115		120			125
Glu Arg Phe Asp Tyr Lys Gly Ile Glu Arg Asn Tyr Leu Leu Gly Ala						
	130		135			140
Ile Pro Trp Ala Leu Ser Arg Ala Leu Pro Val Phe Phe Ala Leu Ala						
	145		150		155	160
Phe Gly Gly Ala Phe Val Gln Ser Val Val Asp Phe Val Glu Ala Tyr						
	165			170		175
Lys Trp Val Ala Asp Gly Leu Thr Leu Ala Gly Arg Met Leu Pro Gly						
	180			185		190
Leu Gly Phe Ala Ile Leu Leu Arg Tyr Leu Pro Val Lys Arg Asn Leu						
	195		200			205
His Tyr Leu Ala Met Gly Phe Gly Leu Thr Ala Met Leu Thr Val Leu						
	210		215			220
Tyr Ser Tyr Val Thr Gly Leu Gly Gly Ala Val Ala Gly Ile Val Gly						
	225		230		235	240
Thr Leu Pro Ala Glu Val Ala Glu Lys Ile Gly Phe Val Asn Asn Phe						
	245			250		255
Lys Gly Leu Ser Met Ile Gly Ile Ser Ile Val Gly Ile Phe Leu Ala						
	260			265		270
Val Leu His Phe Lys Asn Ser Gln Lys Val Ala Val Ala Ala Pro Ser						
	275		280			285

Thr Pro Ser Glu Ser Gly Glu Ile Glu Asp Asp Glu Phe
 290 295 300

<210> 749

<211> 276

<212> PRT

<213> Streptococcus pneumoniae

<400> 749

Met Gly Lys Ser Lys Met Thr Asn Ser Asn Tyr Lys Leu Thr Lys Glu
 1 5 10 15

Asp Phe Asn Gln Ile Asn Lys Arg Ser Leu Phe Thr Phe Gln Leu Gly
 20 25 30

Trp Asn Tyr Glu Arg Met Gln Ala Ser Gly Tyr Leu Tyr Met Ile Leu
 35 40 45

Pro Gln Leu Arg Lys Met Tyr Gly Asp Gly Thr Pro Glu Leu Lys Glu
 50 55 60

Met Met Lys Val His Thr Gln Phe Phe Asn Thr Ser Pro Phe Phe His
 65 70 75 80

Thr Ile Ile Ala Gly Phe Asp Leu Ala Met Glu Glu Lys Asp Gly Val
 85 90 95

Gly Ser Lys Asp Ala Val Asn Gly Ile Lys Thr Gly Leu Met Gly Pro
 100 105 110

Phe Ala Pro Leu Gly Asp Thr Ile Phe Gly Ser Leu Val Pro Ala Ile
 115 120 125

Met Gly Ser Val Ala Ala Thr Met Ala Ile Ala Gly Gln Pro Trp Gly
 130 135 140

Ile Phe Leu Trp Ile Ala Val Ala Val Ala Tyr Asp Ile Phe Arg Trp
 145 150 155 160

Lys Gln Leu Glu Phe Ala Tyr Lys Glu Gly Val Asn Leu Ile Asn Asn
 165 170 175

Met Gln Ser Thr Leu Thr Ala Leu Ile Asp Ala Ala Ser Val Leu Gly
 180 185 190

Val Phe Met Met Gly Ala Leu Val Ala Thr Val Ile Asn Phe Glu Ile
 195 200 205

Ser Tyr Lys Leu Pro Ile Gly Glu Lys Met Ile Asp Phe Gln Asp Ile
 210 215 220

Leu Asn Gln Ile Phe Pro Arg Leu Leu Pro Ala Ile Phe Thr Ala Phe
 225 230 235 240

Ile Phe Trp Leu Leu Gly Lys Lys Gly Met Asn Ser Thr Lys Ala Ile
 245 250 255

Gly Ile Ile Ile Val Leu Ala Leu Ala Leu Ser Ala Leu Gly His Phe
 260 265 270

Ala Leu Gly Met
 275

<210> 750

<211> 388

<212> PRT

<213> Streptococcus pneumoniae

<400> 750

Met Leu His Tyr Thr Lys Glu Asp Leu Leu Glu Leu Gly Ala Glu Ile
 1 5 10 15

Thr Thr Arg Glu Ile Tyr Gln Gln Pro Asp Val Trp Arg Glu Ala Phe
 20 25 30

Glu Phe Tyr Gln Ala Lys Arg Glu Glu Ile Ala Ala Phe Leu Gln Glu
 35 40 45

Ile Ala Asp Lys His Asp Tyr Ile Lys Val Ile Leu Thr Gly Ala Gly
 50 55 60

Thr Ser Ala Tyr Val Gly Asp Thr Leu Leu Pro Tyr Phe Lys Glu Val
 65 70 75 80

Tyr Asp Glu Arg Lys Trp Asn Phe Asn Ala Ile Ala Thr Thr Asp Ile
 85 90 95

Val Ala Asn Pro Ala Thr Tyr Leu Lys Lys Asp Val Ala Thr Val Leu
 100 105 110

Val Ser Phe Ala Arg Ser Gly Asn Ser Pro Glu Ser Leu Ala Thr Val
 115 120 125

Asp Leu Ala Lys Ser Leu Val Asp Glu Leu Tyr Gln Val Thr Ile Thr
 130 135 140

Cys Ala Ala Asp Gly Lys Leu Ala Leu Gln Ala His Gly Asp Asp Arg
 145 150 155 160

Asn Leu Leu Leu Leu Gln Pro Ala Val Ser Asn Asp Ala Gly Phe Ala
 165 170 175

Met Thr Ser Ser Phe Thr Ser Met Met Leu Thr Thr Leu Leu Val Phe
 180 185 190

Asp Pro Thr Glu Phe Ala Val Lys Ser Glu Arg Phe Glu Val Val Ser
 195 200 205

Ser Leu Ala Arg Lys Val Leu Asp Lys Ala Glu Asp Val Lys Glu Leu
 210 215 220

Val Asp Leu Asp Phe Asn Arg Val Ile Tyr Leu Gly Ala Gly Pro Phe
 225 230 235 240

Phe Gly Leu Ala His Glu Ala Gln Leu Lys Ile Leu Glu Leu Thr Ala
 245 250 255

Gly Gln Val Ala Thr Met Tyr Glu Ser Pro Val Gly Phe Arg His Gly
 260 265 270

Pro Lys Ser Leu Ile Asn Asp Asn Thr Val Val Leu Val Phe Gly Thr
 275 280 285

Thr Thr Asp Tyr Thr Arg Lys Tyr Asp Leu Asp Leu Val Arg Glu Val
 290 295 300

Ala Gly Asp Gln Ile Ala Arg Arg Val Val Leu Leu Ser Asp Gln Ala
305 310 315 320

Phe Gly Leu Glu Asn Val Lys Glu Val Ala Leu Gly Cys Gly Gly Val
325 330 335

Leu Asn Asp Ile Tyr Arg Val Phe Pro Tyr Ile Val Tyr Ala Gln Leu
340 345 350

Phe Ala Leu Leu Thr Ser Leu Lys Val Glu Asn Lys Pro Asp Thr Pro
355 360 365

Ser Pro Thr Gly Thr Val Asn Arg Val Val Gln Gly Val Ile Ile His
370 375 380

Glu Tyr Gln Lys
385

<210> 751

<211> 203

<212> PRT

<213> Streptococcus pneumoniae

<400> 751

Met Ser Arg Tyr Thr Gly Pro Ser Trp Lys Gln Ala Arg Arg Leu Gly
1 5 10 15

Leu Ser Leu Thr Gly Thr Gly Lys Glu Leu Ala Arg Arg Asn Tyr Val
20 25 30

Pro Gly Gln His Gly Pro Asn Asn Arg Ser Lys Leu Ser Glu Tyr Gly
35 40 45

Leu Gln Leu Ala Glu Lys Gln Lys Leu Arg Phe Thr Tyr Gly Val Gly
50 55 60

Glu Lys Gln Phe Arg Asn Leu Phe Val Gln Ala Thr Lys Ile Lys Gly
65 70 75 80

Gly Ile Leu Gly Phe Asn Phe Met Leu Leu Leu Glu Arg Arg Leu Asp
85 90 95

Asn Val Val Tyr Arg Leu Gly Leu Ala Thr Thr Arg Arg Gln Ala Arg
100 105 110

Gln Phe Val Asn His Gly His Ile Leu Val Asp Gly Lys Arg Val Asp
115 120 125

Ile Pro Ser Tyr Arg Val Thr Pro Gly Gln Val Ile Ser Val Arg Glu
130 135 140

Lys Ser Leu Lys Val Pro Ala Ile Leu Glu Ala Val Glu Ala Thr Leu
145 150 155 160

Gly Arg Pro Ala Phe Val Ser Phe Asp Ala Glu Lys Leu Glu Gly Ser
165 170 175

Leu Thr Arg Leu Pro Glu Arg Asp Glu Ile Asn Pro Glu Ile Asn Glu
180 185 190

Ala Leu Val Val Glu Phe Tyr Asn Lys Met Leu
195 200

<210> 752

<211> 328

<212> PRT

<213> Streptococcus pneumoniae

<400> 752

Met Ala Lys Asp Ile Arg Val Leu Leu Tyr Tyr Leu Tyr Thr Pro Ile
1 5 10 15

Glu Asn Ala Glu Gln Phe Ala Ala Asp His Leu Ala Phe Cys Lys Ser
20 25 30

Ile Gly Leu Lys Gly Arg Ile Leu Val Ala Asp Glu Gly Ile Asn Gly
35 40 45

Thr Val Ser Gly Asp Tyr Glu Thr Thr Gln Lys Tyr Met Asp Tyr Val
50 55 60

His Ser Leu Pro Gly Met Glu Glu Leu Trp Phe Lys Ile Asp Glu Glu
65 70 75 80

Asn Glu Gln Ala Phe Lys Lys Met Phe Val Arg Tyr Lys Lys Glu Ile
 85 90 95

Val His Leu Gly Leu Glu Asp Asn Asp Phe Asp Asn Asp Ile Asn Pro
 100 105 110

Leu Glu Thr Thr Gly Ala Tyr Leu Ser Pro Lys Glu Phe Lys Glu Ala
 115 120 125

Leu Leu Asp Lys Asp Thr Val Val Leu Asp Thr Arg Asn Asp Tyr Glu
 130 135 140

Tyr Asp Leu Gly His Phe Arg Gly Ala Ile Arg Pro Asp Ile Arg Asn
 145 150 155 160

Phe Arg Glu Leu Pro Gln Trp Val Arg Asp Asn Lys Glu Lys Phe Met
 165 170 175

Asp Lys Arg Val Val Val Tyr Cys Thr Gly Gly Val Arg Cys Glu Lys
 180 185 190

Phe Ser Gly Trp Met Val Arg Glu Gly Tyr Lys Asp Val Gly Gln Leu
 195 200 205

His Gly Gly Ile Ala Thr Tyr Gly Lys Asp Pro Glu Val Gln Gly Glu
 210 215 220

Leu Trp Asp Gly Lys Met Tyr Val Phe Asp Glu Arg Ile Ala Val Asp
 225 230 235 240

Val Asn His Val Asn Pro Thr Ile Val Gly Lys Asp Trp Phe Asp Gly
 245 250 255

Thr Pro Cys Glu Arg Tyr Val Asn Cys Gly Asn Pro Phe Cys Asn Arg
 260 265 270

Arg Ile Leu Thr Ser Glu Glu Asn Glu Asp Lys Tyr Leu Arg Gly Cys
 275 280 285

Ser His Glu Cys Arg Val His Pro Arg Asn Arg Tyr Val Ser Lys Asn
 290 295 300

Glu Leu Thr Gln Ala Glu Val Ile Glu Arg Leu Ala Ala Ile Gly Glu
305 310 315 320

Ser Leu Asp Gln Ala Ala Thr Val
325